HOLLYWOOD ASSEMBLY, APRIL 11, 12, 13, 14, 1951

VOLUME XVI DECEMBER, 1950 NUMBER 12

The Southern Surgeon

Official Publication
of
The Southeastern Surgical Congress
The Southwestern Surgical Congress

EDITORIAL STAFF

I. A. BIGGER, M.D., RICHMOND
FRANK K. BOLAND, M.D., ATLANTA
WARREN COLE, M.D., CHICAGO
GEORGE CRILE, M.D., CLEVELAND
GEORGE CURTIS, M.D., COLUMBUS
M. Y. DABNEY, M.D., BIRMINGHAM
T. C. DAVISON, M.D., ATLANTA
MICHAEL E. DEBAKEY, M.D., HOUSTON
CLAUDE J. HUNT, M.D., KANSAS CITY
ARNOLD JACKSON, M.D., MADISON
EDWARD JELKS, M.D., JACKSONVILLE
J. HARVEY JOHNSTON, JR., M.D., JACKSON
ROBERT MAJOR, M.D., AUGUSTA
SAMUEL F. MARSHALL, M.D., BOSTON
J. D. MARTIN, JR., M.D., ATLANTA
RUDOLPH MATAS, M.D., NEW ORLEANS
CHARLES MAYO, M.D., ROCHESTER
R. B. McKNIGHT, M.D., CHARLOTTE
NORMAN MILLER, M.D., ANN ARBOR
THOMAS D. MOORE, M.D., MEMPHIS
ALTON OCHSNER, M.D., NEW ORLEANS
HOMER PEARSON, M.D., MIAMI
CURTICE ROSSER, M.D., DALLAS
R. L. SANDERS, M.D., MEMPHIS
AUGUSTUS STREET, M.D., VICKSBURG
DAVID A. WILSON, M.D., GREENVILLE

EDITOR
IRVIN ABELL, JR., M.D., LOUISVILLE

MANAGING EDITOR
B. T. BEASLEY, M.D., ATLANTA

BOOK REVIEW EDITOR
A. H. LETTON, M.D., ATLANTA

ABSTRACT EDITOR
R. H. STEPHENSON, M.D., ATLANTA

ASSOCIATE EDITORS
CHAS. R. ROUNTREE, M.D., OKLAHOMA CITY
H. EARLE CONWELL, M.D., BIRMINGHAM
J. DUFFY HANCOCK, M.D., LOUISVILLE

Published Monthly
by
THE SOUTHERN SURGEON PUBLISHING CO.
701 Hurt Building, Atlanta 3, Ga., U.S.A.

Entered as Second-Class Mail Matter June 25, 1946 at the Post Office at Atlanta, Ga., Under the Act of March 3, 1879.

CONTENTS

Ureteral Injury Complicating Fracture of the Bony Pelvis.....1139
ARTHUR J. BUTT, M.D., and JOSEPH Q. PERRY, M.D.
Pensacola, Fla.

Tantalum Mesh in the Repair of Ventral and Inguinal Hernias.....1143
AMOS R. KOONTZ, M.D., Baltimore, Md.

Extrapleural Methyl Methacrylate Plombage in the Treatment of Apical Pulmonary Tuberculosis 1149
O. C. BRANTIGAN, M.D., Baltimore, Md.

Surgical Problems in the Aged Negro.....1163
WILLARD H. PARSONS, M.D., and WILLIAM T. WILLIAMS, M.D.
Vicksburg, Miss.

Invasive Fibrous Tumors of the Abdominal Wall.....1177
ROBERT M. MOORE, M.D.; ED. B. ROWE, M.D., and
W. B. KING, JR., M.D., Galveston, Texas

Treatment of Peritonitis of Appendiceal Origin with Aureomycin.....1192
GEORGE H. YEAGER, M.D.; WILLIAM D. LYNN, M.D., and
THOMAS G. BARNES, M.D., Baltimore, Md.

Two Types of Plastic Operations of Particular Interest to the General Surgeon 1200
HARRY LEE CLAUD, M.D., Washington, D. C.

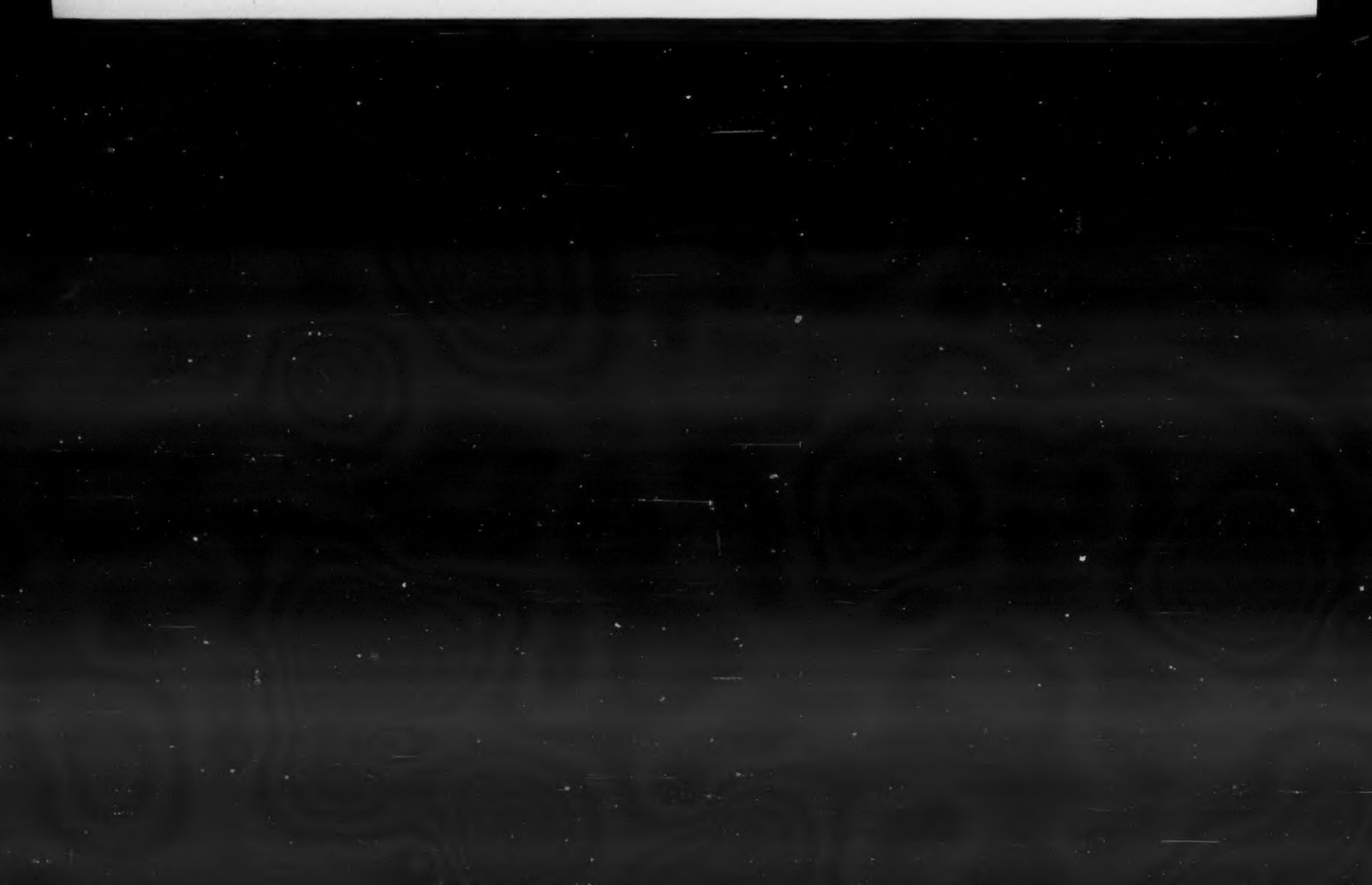
EDITORIAL: A Receptive and Analytic Mind: An Essential to Surgical Progress 1217
CHARLES W. MAYO, M.D., Rochester, Minn.

Book Reviews 1219
A. H. LETTON, M.D., Atlanta

Abstracts from Current Literature.....1221
R. H. STEPHENSON, M.D., Atlanta

Index to Volume XVI.....1228

Announcement 1238



The
Southern Surgeon

Subscription in the United States, $8.00

Vol. XVI, No. 12 Copyright 1950 by
The Southern Surgeon Publishing Co. December, 1950

URETERAL INJURY COMPLICATING FRACTURE OF THE BONY PELVIS

ARTHUR J. BUTT, M.D.
JOSEPH Q. PERRY, M.D.
Pensacola, Fla.

UROLOGIC injuries are estimated to occur in from 7 to 40 per cent of pelvic fractures; however, there is scant mention of ureteral injury complicating this type of fracture.[1,20] There is no "typical" early picture of nonpenetrating ureteral injury, especially when it is accompanied by pelvic fracture. Tenderness or rigidity of the affected side is usually present, although these symptoms are almost invariably present as a result of the fractured pelvis. Penetrating ureteral injuries usually result in urinary extravasation. Signs of peritonitis follow when the extravasation is intraperitoneal. If extravasation is retroperitoneal, it may become evident by the formation of a mass in the involved area or by the development of a cutaneous urinary fistula.

Because of intimate relationship between the lower ureter and the pelvis, the ureter may be crushed against the adjacent bone. Injury is more likely to occur at the level where the ureter crosses the pelvic brim. There may result a contusion of the ureteral and periureteral tissue with resultant stricture formation or a sharp spicule of bone may pierce, lacerate, or sever the ureter.

Excretory urograms should be made in all patients with severe injuries of the abdomen or pelvis or when there is suspicion of urologic injury following any type of trauma. These studies will demonstrate the presence or absence of renal function of one or both kidneys, and the level of injury may be ascertained. Cystoscopic examination will reveal if there is urinary excretion or bleeding from the ureteral orifices. Ureteral catheterization and retrograde pyelo-ureterograms are often necessary to confirm the diagnosis, but such

procedures should be performed with caution if extravasation is suspected.

Rupture of the bladder or urethra are frequent complications of fractured pelvis and must be differentiated from ureteral injury. Rectal examination should be done in all cases of pelvic fracture. This will often reveal induration indicative of perivesical cellulitis or the apex of the prostate may be elevated from its normal position. Passage of a catheter into the bladder is frequently impossible when the urethra is ruptured. If the catheter can be passed, a cystogram is made to determine whether the bladder is intact. If there is no extravasation around the bladder, then the tip of the catheter is withdrawn into the urethra and a urethrogram is made to determine if extravasation has occurred in this area. The absence of bloody urine or the fact that the patient can void does not necessarily rule out injury to the urinary tract.[1,5] Diversion of the urinary stream, preferably by cystostomy, should be performed when extravasation from the bladder or urethra is demonstrated or even suspected.

If there is evidence of extravasation from the ureter, surgical exploration is indicated. A small tear of the ureter will close spontaneously, and drainage of the involved area is usually sufficient. When it is necessary to close the wound by suture, a catheter should be secured in position for splinting and diversion of urine. In the case of complete severance of the ureter, end-to-end anastomosis, uretero-ureteral anastomosis, or implantation of the ureter into the bladder or colon should be considered. Although immediate results appear favorable, the later results often prove unsatisfactory. The patient should be followed closely with frequent pyelograms and ureteral dilatations. When there is such great damage or loss of ureteral tissue that repair is impossible nephrectomy is mandatory. There must be absolute evidence that the opposite kidney is present and functioning adequately. Treatment of ureteral injury complicating pelvic fracture requires the closest cooperation between the urologist, the orthopedic surgeon, and the roentgenologist.

Case Report

A 33 year old woman was referred for urological consultation because of pain in the right flank and right lower quadrant. In 1926 she was injured in an automobile accident and sustained a fracture of the bony pelvis. At the time of injury, she was cystoscoped because of gross hematuria, and blood was seen to be oozing from the right ureteral orifice. A catheter was passed to the pelvis of the right kidney and secured in position for three weeks. Following recovery from the fracture, she had no symptoms until 1935 when she began having repeated attacks of chills, fever, pain in the right flank, the right lower quadrant and gross hematuria. These symptoms persisted periodically

until seen by us in August, 1947. At that time she appeared chronically ill. The right kidney was moderately enlarged and tender. Two plus albumin and three plus pus were present in the urine, and B. coli and staphylococcus aureus were cultured from the urine. Nonprotein nitrogen was 33. Hemoglobin was 72 per cent. Erythrocytes, 3,170,000. Leukocyte count was normal.

X-rays of the abdomen and pelvis showed a marked deformity of the right ilium and ischium with considerable dystoxia of the true pelvis. Excretory urograms revealed delayed appearance of the contrast medium (25 minutes) in the right kidney with moderate hydronephrosis and dilated, tortuous ureter extending to the pelvic brim (fig. 1). The left kidney and ureter were normal. Cystoscopy revealed that the bladder was essentially normal except for edema surrounding the right ureteral orifice.

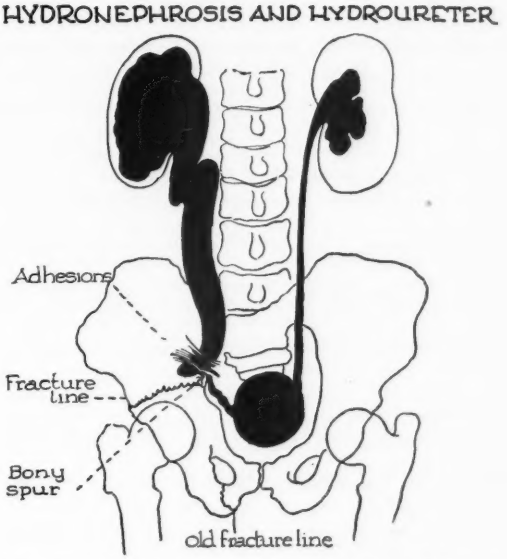


Fig. 1. Schematic drawing illustrating ureteral injury complicating pelvic fracture.

Indigo carmine appeared in three minutes, good concentration, at the left orifice and in nine minutes, poor concentration, on the right. A No. 5 ureteral catheter was passed up the right ureter and met an impassable obstruction at 7 cm. At operation, Sept. 1, 1947, the right kidney was found to be hydronephrotic and the ureter dilated and tortuous. At the level of the pelvic brim, the ureter was firmly embedded in dense scar tissue, and could not be mobilized without danger of injuring the iliac vessels. Since the ureteral stricture could not be corrected, the kidney and upper two-thirds of the ureter were removed. Since operation, she has been asymptomatic.

CONCLUSION

There is no "typical" early picture of ureteral injury complicating

pelvic fracture. This may account for the very few cases of this type which have been reported, and their true incidence is possibly greater than is generally assumed. A case of ureteral injury complicating pelvic fracture is reported. Apparently the ureteral and periureteral tissue at the level of the pelvic brim was contused and lacerated by fractured bones, and a dense periureteritis and ureteral stricture, producing hydronephrosis and hydroureter, developed. Plastic repair of the ureter was deemed impossible; therefore, the kidney and upper two-thirds of the ureter were removed.

BIBLIOGRAPHY

1. Butt, A. J., and Moore, T. D.: Urologic complications of pelvic fractures, South. Surg. *13:*508-520 (Aug.) 1947.
2. Noland, L., and Conwell, H. E.: Fractures of the pelvis: A summary of treatment and results in 185 cases, Surg., Gynec. & Obst. *56:*522-525 (Feb.) 1933.
3. McCague, E. J., and Semans, J. H.: Management of traumatic rupture of the urethra and bladder complicating fractures of the pelvis, J. Urol. *52:*36-41 (July) 1944.
4. Noland, L., and Conwell, H. E.: Acute fractures of the pelvis: Treatment and result in 125 cases, J.A.M.A. *94:*174-178 (Jan. 18) 1930.
5. Simpson-Smith, A.: Traumatic rupture of the urethra, Brit. J. Surg. *24:*309-332 (Oct.) 1936.
6. Crane, J. J., and Shenck, G. F.: Rupture of the urinary bladder, Urol. & Cutan. Rev. *36:*614-619 (Sept.) 1932.
7. Harrison, J. H.: The treatment of rupture of the urethra especially when accompanying fracture of the pelvic bones, Surg., Gynec. & Obst. *72:*622-631 (March) 1941.
8. Smith, G. G., and Mintz, E. R.: Rupture of the male urethra, New England J. Med. *205:*421-424 (Aug. 27) 1931.
9. Foulds, G. S.: Traumatic rupture of the urethra and bladder, Canad. M.A.J. *22:*365-368 (March) 1930.
10. Culver, H.: Traumatic rupture of the male urethra, Illinois M. J. *74:*500-506 (Dec.) 1938.
11. Gordon-Taylor, G.: Complicated injuries of the urinary tract, Brit. J. Urol. *12:*1-28 (March) 1940.
12. Stirling, W. C.: Traumatic rupture of the bladder and urethra: Report of cases, J. Urol. *17:*503-508 (May) 1927.
13. Stirling, W. C., and Belt, N.: Traumatic rupture of the bladder with perivesical extravasation, report of 7 cases, J.A.M.A. *92:*2006-2009 (June 15) 1929.
14. Wakeley, C. P. G.: Fracture of the pelvis: An analysis of 100 cases, Brit. J. Surg. *17:*22-29 (July) 1929.
15. Conway, F. M.: Fracture of the pelvis: Clinical study of fifty-six cases, Am. J. Surg. *30:*69-82 (Oct.) 1935.
16. Wesson, M. B.: Rupture of the ureter: a medico-legal problem, Calif. & West. Med. *37:*296-302 (Nov.) 1932.
17. Hawes, L. E.: Late effects of battle wounds in the genito-urinary tract, J. Urol. *56:*561-583 (Nov.) 1946.
18. Robinson, J. N., and others: Injuries to the genito-urinary tract in the European theatre of operations, J. Urol. *66:*498-507 (Oct.) 1946.
19. Echternacht, A. P.: Injuries of the urinary tract; roentgenological considerations, Urol. & Cutan. Rev. *49:*357 (June) 1945.
20. Graham, W. H.: Management of injuries to the genito-urinary system during war, J. Urol. *57:*73-78 (Jan.) 1947.

TANTALUM MESH IN THE REPAIR OF VENTRAL AND INGUINAL HERNIAS*

AMOS R. KOONTZ, M.D.
Baltimore, Md.

EARLY in 1946 the Director of Experimental Research of one of our leading surgical supply houses** wrote me that he had a new material which his company had developed and which he called "tantalum gauze." He asked me if I would like to try some of the material out experimentally and clinically. I jumped at the opportunity. Some of the material had also been sent to other surgeons who have since published reports on it.[1-3] So far as I know the first public report on it was made by me before the meeting of the Southern Medical Association in 1947[4] and since then several other reports have been published on the use of the material both experimentally and clinically.[5-8]

Tantalum is a rare metal, apparently entirely inert, causing no evidence of unfavorable reaction in the tissues. The metal was first used in surgery by Burke[9] and Carney and Burch.[10] The wire mesh, however, was first used as outlined in the preceding paragraph. The mesh is made on the same pattern as screening for an ordinary screen door but is made of tantalum wire only 3 mils (0.003 inches) in diameter. The mesh used has been 50x50 mesh—50 strands of wire to the inch in each direction.

Experimental. In the early experimental work,[4] artificially produced defects were made in the abdominal walls of animals and these were repaired with tantalum mesh. Examination of these animals later on showed that the abdominal wall was very strong and that the fibrous tissues of the animal had grown through and around the mesh forming an unusually strong closure. There was not the slightest evidence of unfavorable reaction.

Clinical Uses. The details of the use of the mesh have been published elsewhere,[4-7] and will not be mentioned here, except very briefly. In ventral hernias the material has been used in two ways: (1) as a reinforcement to a suture line which was weak and which in itself was not strong enough to cure the hernia; and (2) to close a defect in which the fascial edges could not be approximated. Fig-

*From the Department of Surgery of the Johns Hopkins University School of Medicine.

Read before the Virginia, West Virginia, Maryland and District of Columbia Section of The Southeastern Surgical Congress, White Sulphur Springs, W. Va., July 14, 1950.

**Dr. Herbert L. Davis, Director of Experimental Research, Ethicon Suture Laboratories, Johnson & Johnson, New Brunswick, N. J.

ure 1 illustrates the method of suturing the material in place. For further details, the reader is referred to the original papers.

In inguinal hernias the material has been used to reinforce the Hesselbach's triangle area in those cases which have poor tissues and large defects. This condition is most frequently found in recurrent hernias, in large direct hernias, and in large scrotal hernias of long standing. The method I have employed in using tantalum mesh to reinforce the first suture line in these cases is in the process of being published elsewhere.[11]

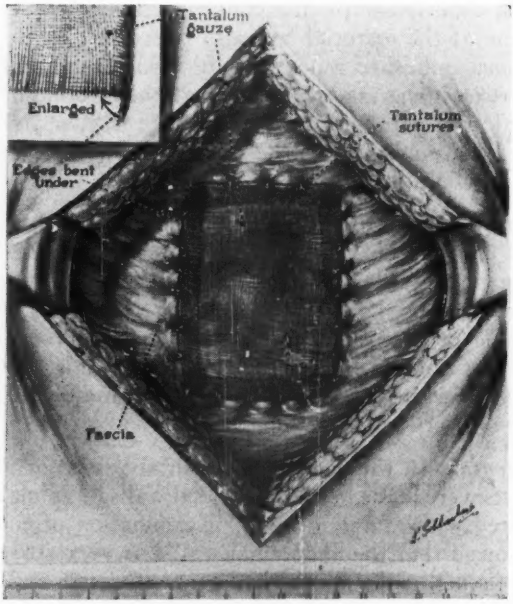


Fig. 1. Technic of suturing tantalum mesh in place. Sutures should be placed through the middle of the turned under area instead of near the edge of it as shown by the artist.

I have operated on 134 cases of large ventral hernias and difficult inguinal hernias (mostly recurrent), the cases being about equally divided between the two types of hernias. The first case was done more than four years ago and the most recent one only a week ago. So far there has been only one recurrence. The recurrence occurred in a case of bilateral inguinal hernia which had been operated upon twice before. One side (the second side done at the operation) had very poor tissues and a large defect. I know from experience gained since then that the piece of tantalum mesh I used was far from being adequate in size. The hernia promptly recurred on this side, but

has since been repaired adequately with tantalum mesh and I believe now that cure will be permanent. The details of this case have been reported elsewhere.[12]

Some of the ventral hernias operated upon I would not have had the temerity to attack had I not had tantalum mesh available. A good example is that of a 39 year old woman who had had an operation about a year and a half previously for cancer of the bladder involving the ileum. A total cystectomy had been done with removal of all the pelvic generative organs and three feet of ileum. The ureters had been transplanted into the sigmoid. The operation had been performed through a transverse incision and the abdominal muscles had retracted in each direction until the defect extended from the umbilicus to the symphysis and laterally in each direction to the inguinal canal. So there was literally nothing below the patient's umbilicus in the nature of an abdominal wall except skin, subcutaneous tissue, and peritoneum. I feel sure that none of the older methods, such as fascia flaps, free transplants of fascia, either autogenous or preserved[13] would have sufficed to cure this patient. However, I had no hesitancy in attempting to close the defect with tantalum mesh, and now, a year and a half after the operation, the patient still has a strong closure. Several of the other cases have had defects almost as large.

Congenital Absence of Abdominal Wall. One case worth mentioning was that of a four year old child with complete congenital absence of the abdominal wall above the umbilicus. This made the child an invalid and prevented him from playing with other children of his age. At operation it was found that he had nothing but skin and peritoneum in the defective area. There was no subcutaneous tissue and no preperitoneal tissue. The skin was tightly glued to the peritoneum and it was very difficult to separate the two. In so doing, each structure was buttonholed in several places. In spite of this the tantalum mesh was placed between the two thin structures and very fortunately "took." This case was done more than two years ago and the result is excellent. Immediately after operation, the child abandoned his role as an invalid and for the first time began a normal life playing normally with other children.

Tantalum Mesh Next to Bowel. Another case worth mentioning was that of a large defect in the left upper quadrant of the abdomen resulting from a gunshot wound. After releasing many intestinal adhesions from the sac, there was just barely enough peritoneum left to close. This case made me wonder what would happen if I did get a case in which the peritoneum could not be closed and in which I wanted to use tantalum mesh. I therefore removed the

ure 1 illustrates the method of suturing the material in place. For further details, the reader is referred to the original papers.

In inguinal hernias the material has been used to reinforce the Hesselbach's triangle area in those cases which have poor tissues and large defects. This condition is most frequently found in recurrent hernias, in large direct hernias, and in large scrotal hernias of long standing. The method I have employed in using tantalum mesh to reinforce the first suture line in these cases is in the process of being published elsewhere.[11]

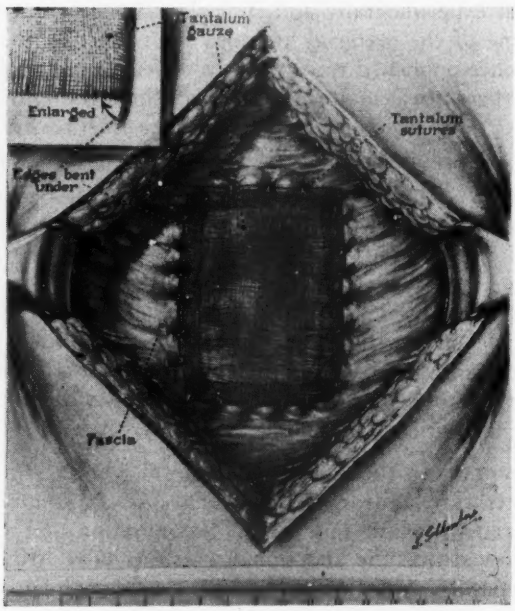


Fig. 1. Technic of suturing tantalum mesh in place. Sutures should be placed through the middle of the turned under area instead of near the edge of it as shown by the artist.

I have operated on 134 cases of large ventral hernias and difficult inguinal hernias (mostly recurrent), the cases being about equally divided between the two types of hernias. The first case was done more than four years ago and the most recent one only a week ago. So far there has been only one recurrence. The recurrence occurred in a case of bilateral inguinal hernia which had been operated upon twice before. One side (the second side done at the operation) had very poor tissues and a large defect. I know from experience gained since then that the piece of tantalum mesh I used was far from being adequate in size. The hernia promptly recurred on this side, but

has since been repaired adequately with tantalum mesh and I believe now that cure will be permanent. The details of this case have been reported elsewhere.[12]

Some of the ventral hernias operated upon I would not have had the temerity to attack had I not had tantalum mesh available. A good example is that of a 39 year old woman who had had an operation about a year and a half previously for cancer of the bladder involving the ileum. A total cystectomy had been done with removal of all the pelvic generative organs and three feet of ileum. The ureters had been transplanted into the sigmoid. The operation had been performed through a transverse incision and the abdominal muscles had retracted in each direction until the defect extended from the umbilicus to the symphysis and laterally in each direction to the inguinal canal. So there was literally nothing below the patient's umbilicus in the nature of an abdominal wall except skin, subcutaneous tissue, and peritoneum. I feel sure that none of the older methods, such as fascia flaps, free transplants of fascia, either autogenous or preserved[13] would have sufficed to cure this patient. However, I had no hesitancy in attempting to close the defect with tantalum mesh, and now, a year and a half after the operation, the patient still has a strong closure. Several of the other cases have had defects almost as large.

Congenital Absence of Abdominal Wall. One case worth mentioning was that of a four year old child with complete congenital absence of the abdominal wall above the umbilicus. This made the child an invalid and prevented him from playing with other children of his age. At operation it was found that he had nothing but skin and peritoneum in the defective area. There was no subcutaneous tissue and no preperitoneal tissue. The skin was tightly glued to the peritoneum and it was very difficult to separate the two. In so doing, each structure was buttonholed in several places. In spite of this the tantalum mesh was placed between the two thin structures and very fortunately "took." This case was done more than two years ago and the result is excellent. Immediately after operation, the child abandoned his role as an invalid and for the first time began a normal life playing normally with other children.

Tantalum Mesh Next to Bowel. Another case worth mentioning was that of a large defect in the left upper quadrant of the abdomen resulting from a gunshot wound. After releasing many intestinal adhesions from the sac, there was just barely enough peritoneum left to close. This case made me wonder what would happen if I did get a case in which the peritoneum could not be closed and in which I wanted to use tantalum mesh. I therefore removed the

entire abdominal wall in dogs, including the peritoneum, and repaired the defect with tantalum mesh. The greater omentum and the spleen were also removed so that there would be no buffer between the intestines and the mesh. Examination of these dogs months later showed that there were mild adhesions between loops of intestine and the mesh, but that they were in no way obstructive and interfered in no way with the health of the animals.[7,8] Shortly after these experiments were completed, I had occasion to remove a huge melanoma from the abdominal wall of a patient and had to sacrifice a good deal of peritoneum. I had no hesitancy in placing tantalum mesh right next to the bowel in closing the defect. This patient was operated upon a year ago and has been perfectly well since then.

Tantalum in the Presence of Infection. Among the various questions which arose fairly early in the game with regard to use of tantalum mesh was the question as to how it would react to infection. Extensive experiments were conducted[8] to determine just how tantalum mesh and tantalum wire (both monofilament and braided) would behave in the presence of infection. Wounds in animals were purposely infected after these materials had been used to repair abdominal defects, and although pus rolled out of the wounds, they healed without sinus formation, leaving a very strong closure just as if the wounds had not been infected. It was found, however, that when silk (or cotton) was used along with the tantalum, a persistent sinus resulted.

As the result of these experiments, I did not hesitate to operate on several cases in which potential infection lurked. One case was that of a hernia following a gallbladder operation in which the patient had had an abscess of the abdominal wall in the hernia area several weeks previous to the operation for the repair of the hernia. His wound did become infected after operation and considerable pus was discharged. However, the wound healed promptly without sinus formation. The second case was that of a huge man weighing 267 pounds who had had a gallbladder operation, wound disruption, hernia, repair of the hernia, followed by recurrence. At the time of operation, due to the enormous pendulous ventral hernia, he had excoriations of the skin, which had been present for a year, and which could not be gotten to heal even with two months of bed rest and treatment before operation. The operation was therefore proceeded with and the defect was found to be 6 inches wide and to extend from the costal margin to Poupart's ligament. This defect was repaired with tantalum mesh, but silk was used to close the peritoneum and subcutaneous tissue. The patient developed a very

severe infection from which pus rolled out. A sinus tract persisted for a year and then closed after an offending silk suture was removed. This patient was operated upon more than two years ago and has a most excellent result. He was a semi-invalid prior to operation but is now happy and healthy and enjoying himself thoroughly.

Another case was that of an 82 year old man who had had a Miles operation with a midline colostomy five years previously. He developed an enormous postoperative hernia with his colostomy opening right in the center of it. A few weeks previous to repairing the hernia, the colostomy opening was moved as far lateralwards as possible. The hernia was repaired with tantalum mesh and the wound healed per primam. I had had no hesitancy in operating in the potentially infected area because the experiments cited above had indicated that had the wound become infected, it woud not have interfered with the cure of the hernia.

In potentially infected cases I now close the peritoneum with braided tantalum wire instead of silk. Braided tantalum wire is preferable to monofilament wire because it does not tend to cut through so readily. I do not like catgut because I do not believe it can be depended upon to stay put until complete healing has taken place.

Mesh Exposed—Closure by Granulation. A woman measuring exactly five feet tall in her stocking feet and weighing 252 pounds in her nightgown had an enormous ventral hernia with a huge hanging flap of abdominal fat. The hernia was repaired with tantalum mesh. After operation, due to the wide dissection of skin flaps and poor circulation, she developed an area of necrosis of the skin and fat 2 inches in diameter. This was many inches deep and had to be cut away, leaving an area of mesh exposed. Granulations could be seen growing through the mesh and the entire area gradually closed. Dr. Frederick W. Wright, of Hanover, Pennsylvania, has reported a similar case,[14] as have also Bussabarger, Dumouchel and Ivy.[15]

Summary

One hundred and thirty-four cases of difficult ventral and inguinal hernias are reported in which tantalum mesh has been used in the repair. The oldest case is more than four years old, and the most recent one, one week old. There has been only one recurrence and that was in an inguinal hernia in which an inadequate piece of mesh was used.

Tantalum mesh may be used with impunity next to the bowel

when there is not sufficient peritoneum to close the defect in the peritoneum.

Tantalum mesh may be used with impunity in the presence of infection, provided such non-absorbable sutures as silk and cotton are not used with it.

Cases in which the mesh was exposed, and in which healing by granulation ensued, are reported.

REFERENCES

1. Throckmorton, T. D.: Tantalum Gauze in the Repair of Hernias Complicated by Tissue Deficiency; A Preliminary Report, Surgery *23:*32-46 (Jan.) 1948.
2. Douglas, D. M.: Repair of Large Herniae with Tantalum Gauze; An Experimental and Clinical Study, Lancet *1:*936-939 (June 19) 1948.
3. Lam, C. R.; Szilagyi, D. E., and Puppendahl, M.: Tantalum Gauze in the Repair of Large Postoperative Ventral Hernias, Arch Surg. *57:*234-244 (Aug.) 1948.
4. Koontz, A. R.: The Repair of Ventral Hernias with Tantalum Mesh; Preliminary Report, South. M. J. *41:*214-217 (March) 1948.
5. Koontz, A. R.: Preliminary Report on the Use of Tantalum Mesh in the Repair of Ventral Hernias, Ann. Surg. *127:*1079-1085 (May) 1948.
6. Koontz, A. R.: Further Experiences with the Use of Tantalum Mesh in the Repair of Large Ventral Hernias, South. M. J. *42:*455-460 (June) 1949.
7. Koontz, A. R.: Tantalum Mesh in Hernia Repair; Experimental and Clinical Results, Tr. South. S. A. *60:*394-403, 1948.
8. Koontz, A. R., and Kimberly, R. C.: Tissue Reactions to Tantalum Mesh and Wire, Ann. Surg. *131:*666-686 (May) 1950.
9. Burke, G. L.: The Corrosion of Metals in Tissues; and an Introduction to Tantalum, Canad. M. A. J. *43:*125-128 (Aug.) 1940.
10. Carney, H. M.: An Experimental Study with Tantalum, Proc. Soc. Exper. Biol. & Med. *51:*147-148 (Oct.) 1942.
11. Koontz, A. R.: The Use of Tantalum Mesh in Inguinal Hernia Repair, Surg., Gynec. & Obst. To be published.
12. Koontz, A. R.: Inguinal Hernias; Some Causes of Recurrence, Am. J. Surg. To be published.
13. Koontz, A. R.: Preserved Fascia in Hernia Repair, with Special Reference to Large Postoperative Hernias, Arch Surg. *26:*500-509 (March) 1933.
14. Wright, F. W.: Personal communication, May 19, 1949.
15. Bussabarger, R. A.; Dumouchel, M. L., and Ivy, W. H.: Use of Tantalum Mesh to Repair a Large Surgical Defect in the Anterior Abdominal Wall, J.A.M.A., *142:*984-985 (April 1) 1950.

EXTRAPLEURAL METHYL METHACRYLATE PLOMBAGE IN THE TREATMENT OF APICAL PULMONARY TUBERCULOSIS*

O. C. BRANTIGAN, M.D.
Baltimore, Md.

EXTRAPLEURAL pneumonolysis or stripping first was reported by Tuffier[1] in 1895 for hemoptysis. There soon followed the efforts of many workers who used extrapleural pneumonolysis and filled the extrapleural space with a large variety of materials. Alexander[2] reported that the following materials have been used: paraffin, pedicle grafts of muscle, breast, fat, free grafts of fat, fresh or preserved omentum, lipomatous and fibroid tumors, muscle, bone, silver wire mesh, activated beef serum, liquefied human fat, gauze, rubber sheeting, inflatable rubber bag, and air. Undoubtedly, paraffin and air were the most popular materials. The former was too heavy and the latter compressible and absorbable. In spite of many and numerous difficulties and relatively poor end results the operative procedure never was abandoned. The methyl methacrylate lucite spheres introduced by Wilson[3,4] in 1946 and his subsequent report[5] created new interest in this method for the treatment of tuberculosis.

Lucite spheres are good plombage material because they are light in weight, will float on fluid, adapt themselves to any space contour, and cause little tissue reaction beyond a thin layer of dense fibrous tissue (figs. 1a and 1b). They are noncarcinogenic and nonallergic. However, they possess certain objectionable characteristics, such as being foreign bodies, rigid and slightly too large (1 inch) in diameter, and requiring sterilization by soaking. Nevertheless, up to the present time methyl methacrylate spheres have proved the best plombage material available. Grindlay and Clagett[6] have done experimental work on a formalinized polyvinyl alcohol sponge. They believe its use is indicated in selected patients. Grow[7] recently used this plastic sponge in 7 selected patients.

Plombage with lucite spheres in the treatment of pulmonary tuberculosis was criticized severely by Trent.[8] A summary of his report on 51 patients is indeed discouraging and reveals that in nearly all patients the disease was classified as far advanced. "Thirteen patients were considered unsuitable for any type of surgical collapse." Early complications were seen in 39.3 per cent of the

*From the Department of Surgery, School of Medicine, University of Maryland, Baltimore, Maryland, and Department of Surgery, Baltimore City Hospitals.

Presented during the Washington Assembly of The Southeastern Surgical Congress, March 6-9, 1950.

patients, with 8 operative deaths. The late complications were found in 31.3 per cent of the patients. The end results were improved in 19.6 per cent, and death occurred in 35.3 per cent. Walkup and Murphy[9] have presented a depressing report and write, "We know of no operation in thoracic surgery that offers so wide a variety of complications, both early and late, as does extrapleural pneumonolysis with plombage," even though they had followed their patients only 14 months. Wilson[10] has not abandoned the operation and still thinks his results are satisfactory. Dolley[11] believes it is a good procedure to follow when thoracoplasty fails to arrest the disease. Grow[12,13] apparently is uncertain about the operation and its results.

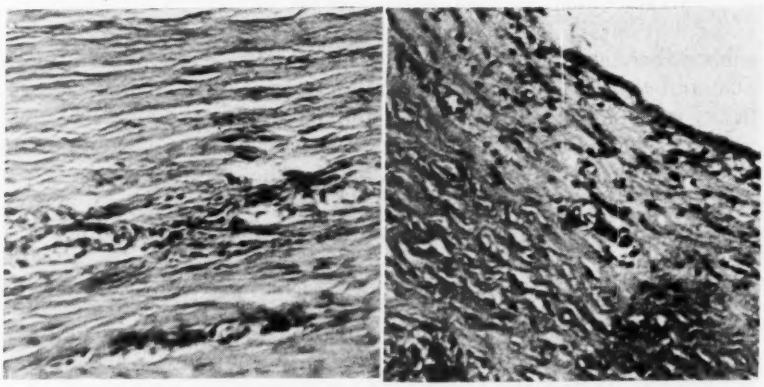


Fig. 1a Fig. 1b

Fig. 1a. Photomicrograph showing fibrous tissue about lucite sphere 11 months after operation in a patient who died from progression of pulmonary tuberculosis. The dense character of the tissue and the complete absence of inflammatory reaction or even lymphocytic reaction can be seen. Fig. 1b. A characteristic section of pleura taken from the parietal pleura on the side of pneumonectomy six weeks after operation. Though there is no foreign body in the pleural space, except air and bloody fluid, there is a mild inflammatory reaction. These two photomicrographs seem to indicate less inflammatory reaction from lucite spheres than from bloody fluid and air.

A discussion of the operation of plombage with lucite spheres should be kept as simple as possible for careful analysis. When it is used under an old thoracoplasty[11] it should be considered a secondary plombage. If it is the only type of collapse therapy employed at the time on a specific lung or side of the chest it should be considered a primary plombage. Both primary and secondary plombage should be distinguished from plumonary prosthesis[14,15] (fig. 2b) in which the spheres are used to fill the empty pleural space after pneumonectomy. This report is concerned only with primary lucite sphere plombage.

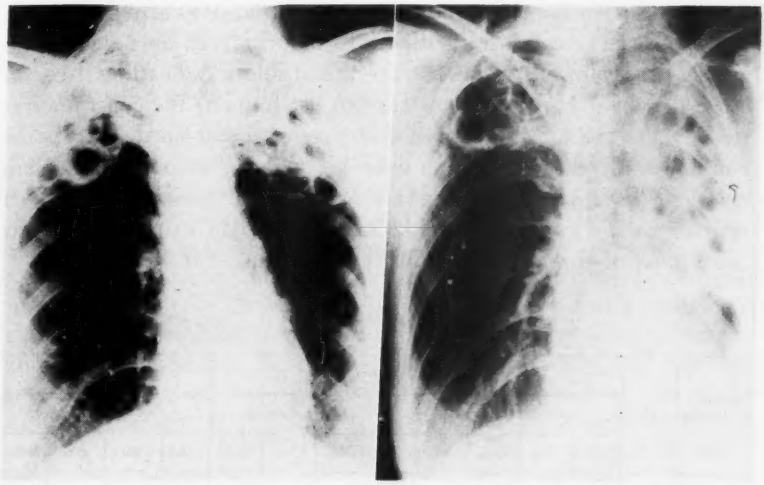


Fig. 2a Fig. 2b

Fig. 2a. Roentgenogram of a successful bilateral lucite sphere plombage. 2b. Roentgenogram of a patient who had a left pneumonectomy for pulmonary tuberculosis. A lucite sphere prosthesis was done on the left. The patient later developed a tuberculous cavity in the right apex. A lucite sphere plombage was done on the right apex. The patient is well and has a negative sputum 17 months after the right apical lucite sphere plombage.

Pulmonary tuberculosis is a bacterial disease and for that reason prophylaxis should be the treatment of choice. When there is failure in prevention of the disease medical treatment arrests the disease in the great majority of patients. In the event medical care fails to arrest the disease, surgery is resorted to as a complementary treatment. All patients subjected to surgery first are given the advantage of medical treatment and when surgery is completed the patient is again returned to a medical regimen. Of course, the better the medical treatment, the more satisfactory will be the end result of surgery. When surgery is indicated there are three general types to be considered: excision, cavity drainage, and collapse therapy.

Collapse therapy is a time honored method of treatment and consists of temporary collapse measures, such as intra and extrapleural pneumothorax, pneumoperitoneum, phrenic nerve paralysis, or permanent collapse measures including the various forms of thoracoplasty, the different types of plombage, and avulsion of the phrenic nerve. Since the stages of the pathologic process in pulmonary tuberculosis vary within the same lobe, a highly variable condition of pulmonary disease may prevail and challenge the indication for diversified types of surgery. If collapse therapy is thought to be the

treatment of choice there may be variable and overlapping reasons why one type of collapse therapy may be preferred over one of the others. It is difficult to enumerate the absolute indications for collapse therapy. However, it is easy to list some of the contraindications, which are tuberculoma of size, extensive caseous disease, gross endobronchial disease causing bronchiectasis, tension cavities, giant cavities, destroyed lung, and atelectasis by fibrotic stricture. Of course, collapse therapy should not be used in exudative disease since most of these patients will recover without it.

CHART NO. I

Negro Patients	NO.	Bilateral Disease								Unilateral Disease			
		Bilateral Plombage				Unilateral Plombage				Unilateral Plombage			
		NO.	Neg.	Pos.	Dead	NO.	Neg.	Pos.	Dead	NO.	Neg.	Pos.	Dead
Male	2	1	-	-	1 100%	1	-	-	1 100%	-	-	-	-
Female	5	-	-	-	-	1	-	-	1 100%	4	2 50%	2 50%	-
Negro Total	7	1	-	-	1 100%	2	-	-	2 100%	4	2 50%	2 50%	-
White Patients													
Male	24	2	1 50%	1 50%	-	15	11 73%	3 20%	1 6%	7	5 71%	1 14%	1 14%
Female	47	8	8 100%	-	-	23	17 74%	5 22%	1 4%	16	14 87%	2 12%	-
White Total	71	10	9 90%	1 10%	-	38	28 74%	8 21%	2 5%	23	19 82%	3 13%	1 4%
Grand Total	78	11	9 82%	1 9%	1 9%	40	28 70%	8 20%	4 10%	27	21 78%	5 18%	1 4%

In apical tuberculosis suitable for collapse therapy it is apparent that extrapleural plombage with methyl methacrylate spheres can accomplish as adequate a collapse as either thoracoplasty or pneumothorax. Walkup and Murphy,[16] who have bitterly opposed the operation, write, "Certainly it obviates the objectionable features of thoracoplasty and from a theoretical standpoint should produce as satisfactory end result." If the mechanical collapse can equal the collapse accomplished by other methods it seems logical that the end results of the treatment should be identical with those of other methods. Should the end results prove inadequate investigations should be undertaken to determine the reasons for failure! If it can be proved that satisfactory end results will be produced in the treatment of apical pulmonary tuberculosis suitable for collapse

therapy it is needless to point out the desirability of one simple safe operation without deformity and with little disturbance of respiratory function. It will therefore serve as a treatment that can be used on both sides of the chest if necessary.

This report is based upon the study of 78 patients who have had 89 plombage operations (chart 1). There were 11 patients with bilateral plombage. The first patient was operated upon on June 24, 1947, and the last in this series in June, 1949. Thus, there is a follow-up of 6 months to 30 months. The follow-up on the series previously reported[17] has been brought up to date and 14 patients have been added. There were 71 white and 7 negro patients; of these there were 2 negro males and 5 negro females, 24 white males and 47 white females. The oldest was 59 years of age and youngest was 16 years old. In 13 patients the contralateral lung was under collapse therapy at the time of the plombage operation; 4 had thoracoplasty and 9 had pneumothorax. The patients were all in good physical condition and were good surgical risks (fig. 3a). However, according to the extent of disease some were not considered ideal for collapse therapy (figs. 3 b and c). The follow-up has been complete.

The patients were referred from many sources, including various sanatoriums and private physicians. The presence or absence of tubercle bacilli was usually determined by repeated direct smears of sputum, but in many it was determined by cultures of the sputum or fasting gastric contents. Of the group 14 (17.9 per cent) have a positive sputum and 58 (74.3 per cent) have a negative sputum. Six (7.7 per cent) of the patients are dead. Of the 11 patients with bilateral plombage (fig. 2a) 9 have a negative sputum and one is dead. It is difficult to determine the presence or absence of a cavity under the lucite spheres, but only 2 have been proved to have a cavity in the area collapsed and both have a positive sputum. All those with positive sputum are in better health than they were before operation. There are no demonstrable open cavities in the group of patients with sputum or gastric contents negative for tubercle bacilli. Of the 14 who have a positive sputum there is disease in the opposite lung of 9 (fig. 3b), and in no instance is it a spread of disease following operation. In the series there are 27 patients without roentgenographic evidence of disease in the opposite lung at the time of surgery (fig. 3a); in the group with unilateral disease 77.7 per cent have a negative sputum and 18.5 per cent have a positive sputum. Six patients died. One was an operative death which occurred three days after operation, with a profound spread of disease on both sides. The other deaths occurred from 3 to 27 months after operation. One died from tuberculous meningitis, diagnosed

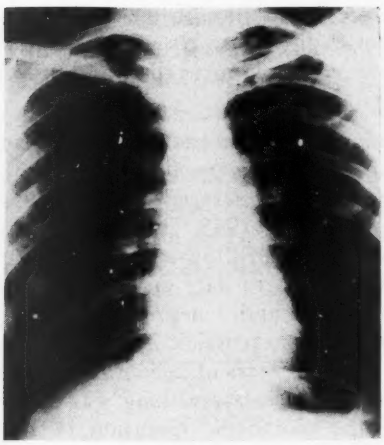


Fig. 3a

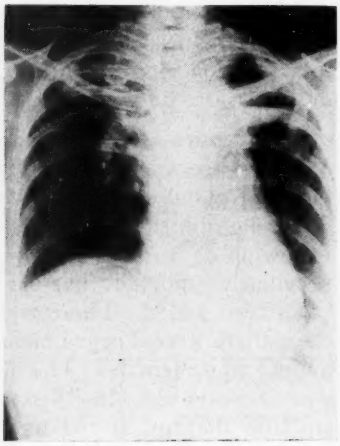


Fig. 3b

Fig. 3a. Roentgenogram shows small tension cavity and minimal infiltration on left. Plombage was done on left with conversion of sputum. 3b. Roentgenogram shows extensive bilateral disease. There is a permanent phrenic paralysis on the right side and a large apical cavity on the left. Plombage was done on the left side. There was conversion of the sputum and closure of the cavity. This patient does not present ideal lesion for collapse by plombage.

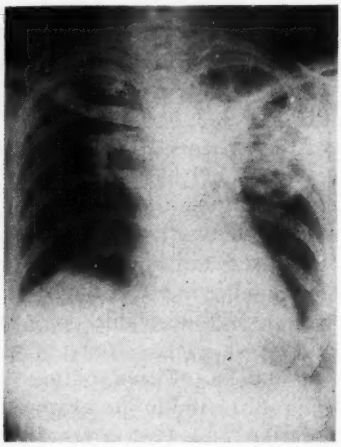


Fig. 3c. Same as 3b after plombage.

and treated before plombage operation; in 3 there was a flare-up of tuberculosis in the opposite lung; in one instance the cause was unknown, but undoubtedly it was from tuberculosis.

The other complications have been minor. Three patients had pneumothorax on the operated side, either spontaneous or from

needle puncture of the lung while the anesthetic was being injected. In 1 of these patients closed drainage by tube suction was instituted with an uneventful recovery. There were 2 patients with bleeding into the extrapleural space. They required aspiration and blood transfusion, but the outcome was satisfactory and the spheres were in the correct position after all blood and fluid were either aspirated or absorbed. One patient developed fluid in the extrapleural space 14 months after operation (fig. 4). By choice the character of this

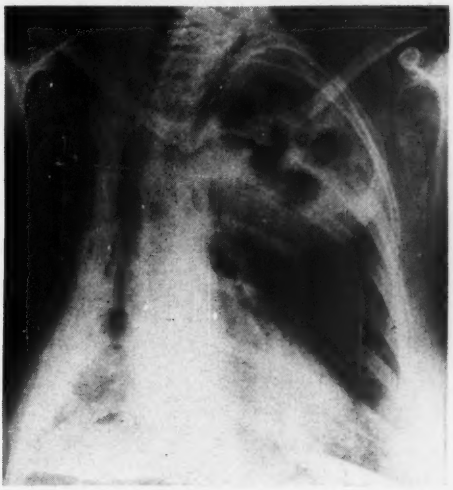


Fig. 4. Roentgenogram showing a collection of fluid about the lucite spheres. The early postoperative collection of fluid was absorbed completely and after 14 months the fluid reappeared. The patient is clinically well and since the accumulation of fluid the sputum has become negative. The fluid has not been aspirated, therefore its character is unknown. This is the only patient in the group of 78 who has developed a fluid about the spheres after absorption of the initial postoperative fluid.

fluid has not been determined; she is clinically well and since the accumulation of fluid her sputum has been negative. All patients have fluid postoperatively and in every instance the fluid was absorbed spontaneously, except those which were complicated by hemorrhage and required aspiration. In 3 patients there was a flare-up of previously existing disease below the area of collapse. In 2 of these patients the attempts to improve the collapse by adding more spheres resulted in failure to accomplish additional collapse. There has been no instance of spread of disease to the opposite lung. No other, either early or late complications, have developed; there has been no wound infection, no extrapleural space infection, and no migration of the lucite spheres.

Since there is a distinct difference in the prognosis of pulmonary tuberculosis in the negro and white races it is important to give the results in these two groups of patients. In the series of 78 patients 7 were negro and 71 were white. In the negro group 28.6 per cent are positive and 28.6 are negative. Three (42.9 per cent) are dead. Death was caused by extension of the contralateral disease in 2 patients. The cause of death in 1 negro patient is unknown but it undoubtedly was tuberculosis. In the negro patients with bilateral disease all are dead. In the living negro patients with unilateral disease 2 (50 per cent) are negative. In the white group of 71 patients 16.9 per cent are positive and 78.9 per cent are negative. Three are dead. In 1 patient death was caused on the third post-operative day by operative spread of the disease; the second patient had a flare-up of old tuberculous meningitis; in the third there was hemorrhage from a large cavity under a contralateral thoracoplasty. In the white patients with bilateral disease 37 (77 per cent) are negative; in the group with unilateral disease 19 (82.6 per cent) are negative.

Fig. 5. The left-hand top insert shows the site of incision as related to the back region and the trapezius muscle. The right-hand top insert shows the extent of the extrapleural dissection to the internal mammary artery anteriorly and the sympathetic trunk posteriorly. The lower right-hand insert shows the use of a mirror to visualize the dissection inferior to the resected portion of the fourth rib posteriorly. The center drawing shows the retracted scapula and the divided trapezius and rhomboid major muscles. The fourth rib has been resected posteriorly. The extrapleural space has been filled with lucite spheres.

All patients have had the benefit of adequate chemotherapy, especially streptomycin, before and after operation. In all but 2 patients, the operations were performed under local anesthesia. The posterior approach has been used in every operation (fig. 5). The posterior incision with resection of part of the fourth rib gives

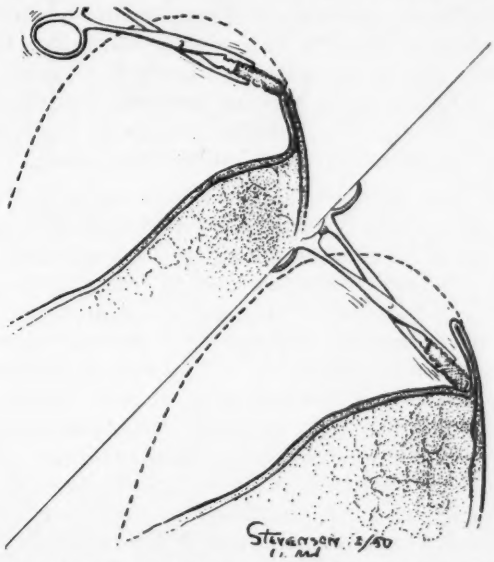


Fig. 6. The drawings show the parietal pleura folded back on itself. This is characteristic of extrapleural stripping operations. (Upper) The pressure of the dissector should be applied to the fold as indicated. The pleura can be stripped away easily without danger of rupture of the parietal pleura. (Lower) If the pressure is applied in the incorrect manner, as indicated, the parietal pleura may be ruptured with a resulting pneumothorax. This makes completion of the operation more difficult.

the closest approach to the region most involved by thickened pleura. The entire procedure can be carried out under direct vision, except immediately inferior to the resected fourth rib. The use of a mirror has been found most beneficial in this region (fig. 5). Stripping under direct vision, with the aid of a gauze on the end of a clamp, has been found safer than the use of finger dissection. The parietal pleura has a tendency to fold back on itself (fig. 6) and unless freed by direct attack at the site of folding the pleura is likely to rupture. If an opening is made into the pleura there is no reason to abandon the operation. When this has occurred the operation in each instance has been carried on to the desired extent and to a successful conclusion. There is little respiratory embarrassment since the patient is under local anesthesia. After the operation is completed and the wound closed all air is aspirated from the pleural cavity. In only one instance was the operation begun and not carried to a

successful termination. In this patient a peripheral cavity was opened when the fourth rib was resected; the operation was abandoned; the patient made an uneventful recovery. The lucite spheres are sterilized by immersion in aqueous zepharin 1:1000 for 18 to 24 hours. The zepharin is carefully rinsed from the spheres. They are then placed in a solution of azochloramid 1:3300 in sodium tetradecyl sulfate 1:500.[18,19] This mixture neutralizes the irritating zepharin and acts as an additional antiseptic agent. The lucite spheres are taken from the solution and placed in the extrapleural space without drying. The number of spheres is determined only by the extent of the space created by the dissection.

The early and late complications have comprised the greatest complaint against this operation. It is evident that the generous administration of chemotherapy will prevent infection in the early postoperative period so long as surgical tear into the lung is prevented. To avoid late space infection arrest of the pulmonary disease is the most effective safeguard. It is obvious that migration of the lucite spheres is impossible if infection is avoided since the spheres are surrounded by a thin layer of dense fibrous tissue when infection does not occur (figs. 1a and b). Spontaneous pneumothorax on the operated side when caused by needle puncture of the lung at the time the local anesthesia is injected can be avoided if the possibility is recognized; if it is not caused by a needle puncture it is impossible to eliminate this complication. However, it can be recognized early and treated properly. It is almost impossible to prevent postoperative hemorrhage for, despite meticulous hemostasis, this complication developed in 2 patients.

Since early and late complications have for the most part been eliminated, the study should be directed toward improvement of the end results as indicated by arresting the disease. It is generally thought that thoracoplasty of the modern standard type affords satisfactory end results; therefore, it is advisable to study the collapse thus produced. In most instances a five to seven rib resection is needed. All of the first three ribs are removed. The collapse is thus carried far to the anterior aspect of the chest and is oblique downward from posterior to anterior. Actually it is a collapse that corresponds to a great extent with the oblique fissure between the upper and lower lobes (fig. 7a). It collapses the upper lobe extensively and only the apex of the lower lobe. When comparing this method with the early cases of plombage it was evident that there was a tendency to restrict the extent of the collapse and that it failed to carry the collapse far enough anteriorly, and particularly anteriorly and inferiorly (figs. 7b, 8a). In most instances the collapse now is carried anteriorly to the internal mammary artery)fig.

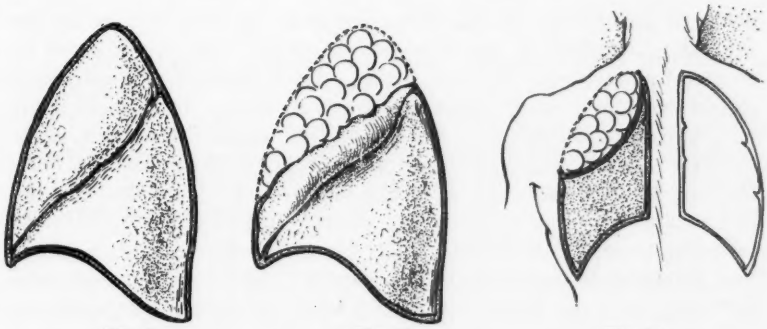


Fig. 7a Fig. 7b Fig. 7c

Fig 7a. A drawing of the normal position of the upper and lower lobes with the oblique fissure. b. This drawing illustrates the proper distribution of the collapse by lucite spheres. The collapse is primarily over the upper lobe. This should be compared with the wrong distribution of collapse indicated in Fig. 8a. Fig. 7c. The drawing shows the lung attached to the mediastinum. It prevents the diseased lung from being depressed into healthy lung tissue, where it might remain uncollapsed. It may be compared with Fig. 8b where the lung is freed from the mediastinum.

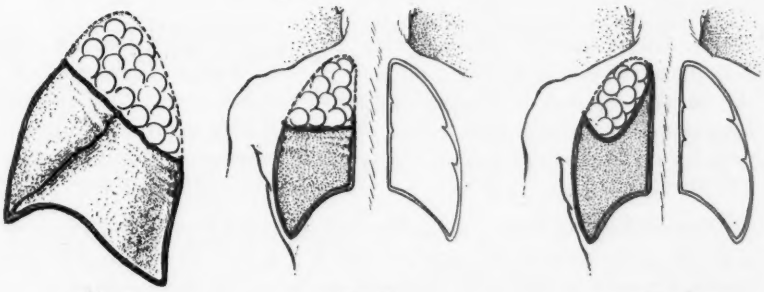


Fig. 8a Fig. 8b Fig. 8c

Fig. 8a. The drawing indicates the wrong method of collapse by lucite sphere plombage. There is not sufficient collapse of the upper lobe. The collapse is not carried far enough anteriorly. This should be compared with the correct extent as indicated in Fig. 7b. Fig. 8b. The drawing shows the lung stripped from the mediastinum which might allow an uncollapsed diseased lung to be depressed into good lung tissue. It can be compared with Fig. 7c, which shows the lung attached to the mediastinum. Fig. 8c. The drawing shows a U-shaped collapse that is thought to be incorrect.

5) and to the third rib anterioinferiorly, even though lesser dissection seems adequate. If this extent is not sufficient it is evident that plombage is not the desirable type of collapse therapy. In thoracoplasty it is advisable to remove the transverse processes. Therefore, in plombage operations the dissection is carried posteriorly just beyond the sympathetic trunk (fig. 5). Posteroinferiorly the dissection is carried beyond the level of disease revealed by roentgeno-

gram or palpation. If the dissection must be carried beyond the seventh or eighth rib the disease is evidently too extensive to be treated by plombage. If necessary at a later date collapse inferiorly cannot be increased if plombage has been done. In thoracoplasty with apicolysis it appeared that freeing the lung allowed the disease to descend into good lung tissue, which remain uncollapsed. Therefore, in the plombage operation the lung is freed from the apex but left attached to the mediastinal pleura (figs. 7c, 8b). This also provides better bronchial drainage. Laterally the collapse should be in a gently sweeping oblique direction and not in "U" shaped position (fig. 8c). In this series presented there is in some patients a failure to carry out bilateral collapse therapy. To determine which patient will do well and which will do poorly by collapse treatment remains one of the greatest problems in the treatment of pulmonary tuberculosis (figs. 3b, 3c). The importance of good medical care after operation is of the utmost importance since the judicious use of the various chemotherapeutic agents may mean the difference between an arrested disease and an active one. In the treatment of tuberculosis surgery of any type is only complementary to medical treatment.

The follow-up has been complete but of short duration. It will take many more years to be certain of the end results. Nevertheless, the present figures indicate a highly favorable trend. When the figures of the present survey are compared with a survey done six months ago the later results are found to be better, again indicating a favorable trend.

Where there is failure to arrest the disease after plombage it is difficult to determine the site of active disease. If the active pulmonary disease is located in the area collapsed by the lucite spheres, physical examination generally is not helpful in determining the exact site; however, roentgenograms of various positions, planograms, and bronchograms may be helpful. Bronchoscopy is also contributive. Where the site of the disease is determined to be in the region of the collapse produced by plombage it seems favorable to remove the lucite spheres and do a thoracoplasty if the collapse is inadequate or to do a pulmonary resection if the collapse is considered adequate. If the active disease is inferior to the area collapsed surely phrenic nerve paralysis and/or pneumoperitoneum should be effective. Two attempts were made to increase the area of collapse at a secondary operation but both failed technically. On one patient with disease in the lingula of the upper lobe of the left lung a relaxing thoracoplasty[20] of the Monaldi type was done and it appears to be effective, but not enough time has elapsed since operation for a true evaluation.

Conclusions

1. Extrapleural lucite ball plombage has been used 89 times in 78 patients.

2. There was one operative death, four deaths occurred in late postoperative periods from progression of pulmonary tuberculosis, and one late postoperative death followed a flare-up of an old tuberculous meningitis.

3. In the whole group of 78 patients 14 (17.9 per cent) have a positive sputum and 58 (74.3 per cent) have a negative sputum, with no demonstrable cavities in the negative group. In the group with bilateral disease 37 (72.5 per cent) have a negative sputum and in the group with unilateral disease 21 (77.7 per cent) have a negative sputum.

4. Early and late complications of a serious nature have not occurred in this series which was followed from 6 to 30 months. The statistical data for white patients is better than for the whole group and better than for the negro group.

5. In apical tuberculosis suitable for collapse therapy there is no mechanical reason why lucite sphere plombage should not be as effective as thoracoplasty or pneumothorax.

BIBLIOGRAPHY

1. Tuffier: Nouvelle méthode d' exploration chirurgicale du poumon (du décollement pleuro-pariétal en chirurgie pulmonaire), Gaz. d. Hôp., Paris, *68:*1320, 1895.
2. Alexander, J.: The Collapse Therapy of Pulmonary Tuberculosis. Baltimore: Charles C Thomas, 1937.
3. Wilson, D. A., and Baker, H.: Experimental Surgical Pulmonary Collapse, Surg., Gynec. & Obst. *82:*735-742 (June) 1946.
4. Wilson, D. A.: Symposium on aseptic surgical technic and its application to thoracic surgery; Use of Methyl Methacrylate Plombage in the Surgical Treatment of Pulmonary Tuberculosis, S. Clin. North America *26:*1060-1070 (Oct.) 1946.
5. Wilson, D. A.: Extrapleural Pneumonolysis with Lucite Plombage; preliminary report, J. Thoracic Surg. *17:*111-122 (Feb.) 1948.
6. Grindlay, J. H., and Clagett, O. T.: A Plastic Sponge Prosthesis for Use after Pneumonectomy; Preliminary Report of an Experimental Study, Proc. Staff Meeting Mayo Clin. *24:*538 (Oct. 12) 1949.
7. Grow, John B.: Personal communication (Dec.) 1949.
8. Trent, J. C.; Moody, J. D., and Hiatt, J. S.: An Evaluation of Extrapleural Pneumonolysis with Lucite Plombage, J. Thorac. Surg. *18:*173-180 (April) 1949.
9. Walkup, H. E., and Murphy, J. D.: A Modern Evaluation of Extrapleural Pneumonolysis in the Treatment of Pulmonary Tuberculosis with Special Reference to Methyl Methacrylate "Plombage"; Review of 26 Cases, Dis. Chest *16:*456-472 (Oct.) 1949.
10. Wilson, D. A.: Personal communication, 1949.
11. Dolley, F. S.: Discussion of Trent, J. C., Moody, J. D., and Hiatt, J. S. An Evaluation of Extrapleural Pneumonolysis with Lucite Plombage, J. Thorac. Surg. *18:*193 (April) 1949.
12. Grow, J. B., and Dwork, R. E.: Extrapleural Pneumonolysis with Lucite Plombage, Brit. J. Tuberc. *42:*3-31 (April) 1948.

13. Grow, J. B.; Hurst, A., and Perlmutter, H. M.: An evaluation of extrapleural pneumonolysis with lucite plombage, Nat. Tuberc. A. Tr. *45:*196-212 (May) 1949.
14. Johnson, J.; Kirby, C. K.; Lazatin, C. S., and Cocke, J. A.: The Use of a Prosthesis to Prevent Overdistention of the Remaining Lung Following Pneumonectomy; preliminary report, Surgery *22:*179-190 (Aug.) 1947.
15. Brantigan, O. C., and Rigdon, H. L.: Pulmonary Prosthesis after Pneumonectomy, Accepted for Publication, J. Thorac. Surg.
16. Walkup, H. E., and Murphy, J. D.: Extrapleural Pneumonolysis with Plombage Versus Thoracoplasty, Dis. Chest, *16:*18-20 (July) 1949.
17. Brantigan, O. C., and Rigdon, H. L.: Extrapleural Pneumonolysis with Lucite Ball Plombage. Accepted for Publication, Dis. Chest.
18. Brantigan, O. C., and Rigdon, H. L.: Sodium Tetradecyl Sulfate, Azochloramide, and Sulfanilamide Mixture in Prevention of Empyema Following Pneumonectomy with Contamination, J. Thoracic Surg. *16:*416-421 (Aug.) 1947.
19. Tonolla, E. H., and Brantigan, O. C.: Treatment of Thoracic Empyema with Sodium Tetradecyl Sulfate 1:500 in Azochloramide 1:3300, Dis. of Chest, *13:*123-132 (March-April) 1947.
20. Katyar, P. D.: Anteriolateral Thoracoplasty in Treatment of Pulmonary Tuberculosis, J. Indian M. A. *37:*115, 1936.

SURGICAL PROBLEMS IN THE AGED NEGRO

WILLARD H. PARSONS, M.D.
WILLIAM T. WILLIAMS, M.D.*
Vicksburg, Miss.

THE surgeon of 1950 faces a number of problems which his confrere of a decade ago encountered only occasionally and which his predecessor of half a century ago never encountered at all. If he is to offer his patients the utmost in life and health that can be achieved by modern surgery, he must contemplate and perform operations which were unheard of 50 years ago and which even a decade ago were still not generally performed. He must, moreover, consider performing these operations, particularly operations of election, in which he has the power of choice, on patients in the upper age groups. Finally, while the Southern surgeon has always had to deal with negro patients, only recently has the question of surgery in the aged negro entered into the picture.

These are not problems which can be brushed aside. They are becoming increasingly important, because of the almost incredible increase in longevity which has come to pass in the past century, and particularly in the past half century.[2] In 1850 the average life expectancy at birth was about 40 years. In 1947, the last year for which precise statistics are available, it had risen to 55.8 years. Most of the gain has occurred under age 50 for white females and under age 60 for white males. Also most of it has occurred in the past 50 years, and in the last decade or two it has occurred at a greatly accelerated rate. Over the past half century, reliable figures for negro life expectancy being available only since 1900 (fig. 1), the male life expectancy in that race has increased from 32.54 years to 57.94 years and the female life expectancy from 35.04 years to 61.86 years.

Statisticians of the Metropolitan Life Insurance Company, whose business it is to be correct about such matters, agree that there is every reason to expect an average life expectancy of 75 years within the next generation. The social implications of that achievement are not the physician's business, but the medical and surgical implications are matters which he must face now and must be prepared to face in the future. To these responsibilities, which in themselves are heavy enough, the surgeon in the South must add the new responsibility of surgery in the aged negro.

From the Vicksburg Clinic and Lutheran Hospital, Vicksburg, Mississippi.
*Fellow in Surgery, Lutheran Hospital.
Presented during the Washington Assembly of The Southeastern Surgical Congress, March 6-9, 1950.

The problems of medical care in the negro race are no new thing to Southern physicians. It was not, however, until Matas[3] in 1896 published his study of racial differences in negro and white disease at Charity Hospital of Louisiana at New Orleans that these variations were examined scientifically. Then most negroes did not live long enough for surgery in the upper age groups to present any special problems; all varieties of surgery, in fact, were more or less in their infancy, at least as compared with the operations that are possible today. Now these problems are frequently encountered, and they are of peculiar importance to a surgeon in Mississippi, where the ratio of negro to white in the population is more nearly equal than it is anywhere else in the country.

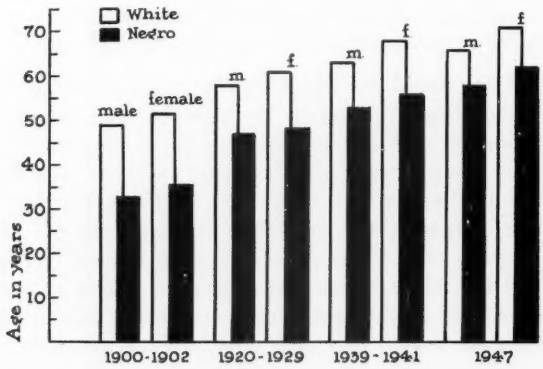


Fig. 1. Life Expectancy of white and negro population at birth, 1900-1947.

Everything that has been said in regard to surgery in the aged white patient holds with special truth for surgery in the aged negro. Patients in the upper age groups lack the organic reserves of youth. They do not react with the elasticity of younger persons. Inflammatory disease progresses rapidly at this period of life. The degenerative diseases take a heavy toll. Malignant disease is frequent, and frequently it requires radical surgery. The diagnosis of certain diseases is frequently delayed, or is missed altogether, because clinical manifestations tend to be atypical, in large measure because of the decreased sensibilities of the aging person. Most important of all, his disease is frequently permitted to become irreversible, partly because so many physicians still seem to believe that age is a sound contraindication to surgery, partly because the negro so often receives inadequate medical care. And that, I would hasten to add,

is a responsibility which the white physician must begin to assume, along with the responsibility he has long assumed for the medical care of his race. If present facilities and regional policies and practices do not permit the negro to have educational opportunities in the medical schools in which white students are trained, then we must see to it that institutions are provided in which he can receive them, and we must devise some acceptable means by which he can also partake of the stimulus of scientific information and discussion.

In 1948, in association with the chief physician of the institution, I presented from the Lutheran Hospital an analysis of the 322 operations performed on 244 patients 60 years of age and over during the 6¾ year period ending in October, 1948.[4] To that series I am now adding an analysis of the 83 operations performed on 80 patients in the same age group for the period ending in December 1949, my intention being to present the combined series chiefly from the standpoint of the 88 negro patients included in it.

For background, let me say that something over 85 per cent of the patients in this 100-bed hospital come from outside of Vicksburg and from outside of Warren County, in which Vicksburg is located. By far the largest number are referred to the hospital, or seek care in it themselves, from a radius of about 150 miles, but a fair number also come from points as far distant as Ohio, Kansas, Michigan, and even California. We have space in the hospital for about 20 negro patients but the daily census is usually in excess of that number. Curiously, many of them come from points quite as distant as the white patients. Theoretically, at least, all of them are private (in the sense of paying) patients. A few are highly educated, even in comparison with white standards, but on the whole their educational status, general hygiene, and living standards are those ordinarily encountered in the Southern negro, which means that they are definitely below the average. Most of them have been treated by one or more physicians, usually by white physicians, because, as has already been mentioned, there are not many practitioners of their own race in Mississippi and in the contiguous portions of Louisiana and Arkansas from which most of the hospital population is derived.

The negro cases in this series are not numerous and when they are broken down into smaller categories the figures are not statistically significant. They must be viewed, therefore, as representing trends. But of the validity of these trends no Southern surgeon can have any doubt. All of the trends, furthermore, point to one inescapable and regrettable conclusion: That negro patients are likely to enter the hospital with more advanced disease than are

white patients and that they sometimes present problems of therapy which are utterly beyond solution.

Racial Mortality

In the 322 operations on 244 patients which I analyzed in 1948, the patient mortality was 11.8 per cent and the surgical mortality 9 per cent. In the 83 operations on 80 patients which I am now adding to the first series, the patient mortality was 10 per cent and the surgical mortality 9.6 per cent. The apparently increased operative mortality is readily explained by the large number of multiple operations (126) in the first series and the insignificant number (three) in the second. The decrease reflects the modern tendency to use one-stage rather than multiple-stage operations whenever circumstances permit. Abdominoperineal resection for carcinoma of the rectum, for instance, now actually carries less hazard to the patient than the two-stage procedure formerly carried. The decrease in the patient mortality, 1.8 per cent, may not seem statistically important but it means the salvage of 18 lives in every 1,000 operations, and about that there is nothing at all unimportant.

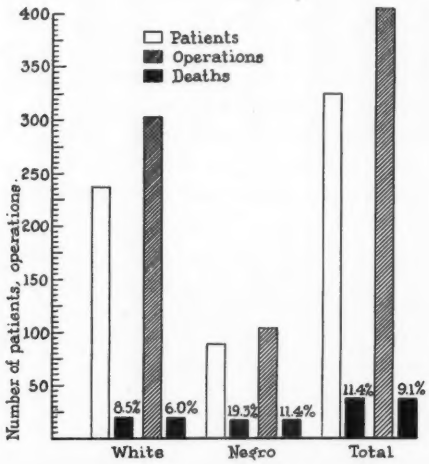


Fig. 2. Racial mortality in 405 operations on 324 patients 60 years of age and over.

The most striking fact in the analysis of these cases, however they are considered, is the difference in the racial mortalities (fig. 2). The white mortality was 8.5 per cent. The negro mortality

was 19.3 per cent. A similar discrepancy is apparent in almost every other reported series from the South in which the mortalities are broken down, as they always should be when the statistics include both white and negro patients. The various studies which have been made from the New Orleans Charity Hospital on acute appendicitis, intestinal obstruction, biliary tract disease, and thyroid disease, among others, are clear proof of the considerable difference in the mortality of the two races when they are submitted to surgery.

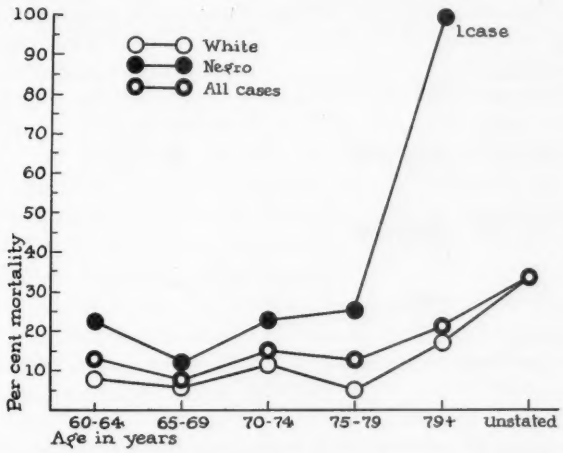


Fig. 3. Surgical mortality according to race and age in 236 white and 88 negro patients.

In connection with what has already been said about the higher life expectancy in the white subject, it is of interest to note that in the white group there were 18 patients, 7.6 per cent of the total number, over 79 years of age against only 1 negro patient (fig. 3). Whether age *per se* plays any part in the surgical mortality it is difficult to say. In white subjects the mortality up to 75 years of age was 8.0 per cent, and over that age 11.1 per cent, which is not a very marked difference. In the negro group the respective mortalities were 17.0 per cent and 30.8 per cent, which is a very striking difference indeed.

Classification of Cases

In the emergency cases in this series there were three deaths in the 12 operations on negro patients (fig. 4) and the same number in the 26 operations on white patients. There was no choice in these

cases. Operation had to be done. A ruptured or gangrenous appendix, an intestinal obstruction, a ruptured ulcer, and similar catastrophes permitted no temporizing. Even had the mortality been higher, operation would still have been justified. But it is characteristic, and to surgeons in the South it is an old story, that in the two cases in which operations were done with full realization of their hopelessness, both the patients were negroes.

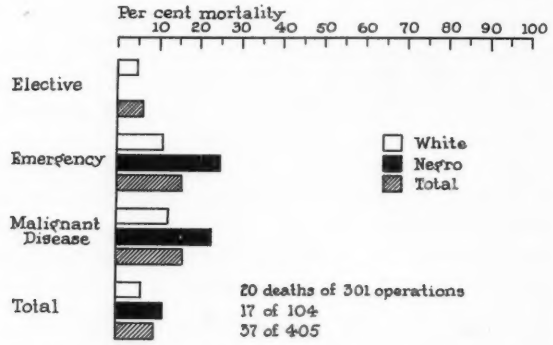


Fig. 4. Racial mortality according to type of surgery in 236 white and 88 negro cases.

In the group of patients with malignant disease, the story is much the same in both races. Both negroes and whites waited unduly long to seek medical aid. The negroes merely waited longer. It is easy to understand, therefore, why in the 43 instances of malignant disease in the negro group five patients could be treated only by exploration, which makes the record a little blacker than the nine explorations in the 86 instances of malignant disease in the white patients. Not a single one of the negro patients who died after operation for malignant disease was a good surgical risk, and in eight of the 10 fatal cases they presented poor risks. That makes the record a little more somber than the seven poor risks in the 11 white patients who died under the same circumstances. It is probably also characteristic that the two patients with malignant disease who died after emergency operation were both negroes; one had a ruptured carcinoma of Meckel's diverticulum with advanced peritonitis and the other an incarcerated ventral hernia associated with an advanced malignancy of the ovary.

In the negro as in the white patients, the elective group of operations furnished, in a sense, the surgeon's greatest dilemma. In these

cases surgical treatment was not essential to prevent an inevitably fatal outcome, as in malignant disease, nor was it of immediate urgency, as in emergency conditions. A diseased gallbladder, for instance, while it might have become gangrenous and ruptured, might never have given more than transient discomfort. A benign polyp of the sigmoid might have remained benign. Hernias might have remained unincarcerated and unstrangulated. And so on. But men advanced in years, with hypertrophied prostate glands, might have developed lethal complications; the fact that there were seven deaths in the 51 cases in this category (five of them in the 22 negro patients) suggests that complications had already ensued in many of these cases, as indeed they had. On the other hand, the patients in this elective group presented the best surgical risks in the series and they were, in effect, being put in deliberate jeopardy of their lives by operation. Ninety-six of the 157 patients submitted to elective surgery were in good condition, but there was, nonetheless, one death in the 79 white cases, although none occurred in the 17 negro cases in this category. Of the 44 patients in fair condition six died, there being three deaths in the 10 negro cases, and of the 17 in poor condition two died, one of the two negro cases terminating fatally.

Only a few of the 405 operations in this series need special comment. They represent a very wide range, from pancreatectomy and total gastrectomy for malignant disease to the excision of benign but significant tumors. One hundred eight, more than a quarter, were for genitourinary conditions in the male, and the eight deaths in the group probably come as no surprise to any surgeon, any more than the five deaths in the 43 operations on negroes come as a surprise to a Southern surgeon. The majority of gastrointestinal operations (exclusive of the 11 appendectomies, one of which was fatal) were for cancer, and the negro mortality, 5 of 9 cases, is chiefly a reflection of the patients' status when they were first seen. The two deaths in the 14 exploratory operations for intra-abdominal malignancy (one in the 5 negro cases, 1 in the 9 white cases) is a sad commentary both on the present methods of diagnosis and on the poor status of the patients submitted to operation. Twenty-two hernia operations of various kinds (4 in the negro) were performed without a death. It is quite remarkable that there were no deaths in the 24 thyroid operations, since many of the patients, 6 of whom were negroes, persented a high degree of toxicity. Thyroid disease in the South, even when it is not toxic, carries a higher mortality than elsewhere in the country, probably, as Boyce[1] suggests, because of its relative infrequency and the consequent lack of familiarity with its manifestations. His various studies from the New Orleans

Charity Hospital have shown that the negro mortality is much higher than the white, and that in some years the mortality of toxic thyroid disease in the negro male has been almost prohibitive.

Anesthesia

We continue to believe that, provided it is selected judiciously and administered competently, the precise anesthetic agent employed does not make a great deal of difference. Certainly it made no particular racial difference in this series. Certain trends are, however, clearly evident. Thus spinal analgesia, which was used in about 18 per cent of the operations in the series reported in 1948 was not used in a single one of the operations in the second series. Sodium pentothal, on the other hand, was used much more frequently. When it is administered fractionally, with the liberal use of oxygen, by a competent anesthetist, it is a safe and satisfactory anesthetic for older persons, one of its greatest advantages in short cases, in which it can be used as the sole agent, being the rapid return to consciousness and the freedom from postoperative complications, so that immediate deep breathing and movement about the bed are possible. These are important precautions in the prevention of respiratory complications and thrombosis and embolism. Sodium pentothal is also excellent for inductions, and it was not infrequently used in long operations, in combination with some one of the inhalation anesthetics. Ether has proved a safe and satisfactory agent for resections of the large bowel. Cyclopropane is equally adequate for operations within the chest.

Our records also show a growing trend toward the use of curare to supplement whatever anesthetic agent is employed. It was used in almost a quarter of the cases in this series, producing excellent relaxation, greatly reducing the amount of anesthetic necessary, and hastening the recovery period, all of which are important considerations in older persons. It is employed, of course, by a strict routine, in limited dosages, and always after means have been provided to establish a patent airway and to maintain controlled breathing.

We continue to be extremely cautious about preanesthetic medication in aged persons. The barbiturates are avoided whenever that is possible. Morphine is used infrequently, and then only in small dosages. Oxygen is used freely, especially at the conclusion of the operation, and the plane of anesthesia is always as light as the surgical necessity permits.

Preoperative Preparation and Postoperative Care

An obvious reason for the discrepancy in the racial mortalities in

this series is the fact that while differences in the gross racial distribution of the surgical risk (fig. 5) were apparently not striking—though all the differences were in favor of the white patients—the negroes, case for case, were generally in worse condition than their white opposite numbers. It is also characteristic, to surgeons who know negroes, that while over half of the total number of operations on white subjects were elective, considerably under half of the operations on negroes were in that category. It would be expected that the surgical hazard would be less in elective operations than it would be in emergency operations and operations for malignant disease.

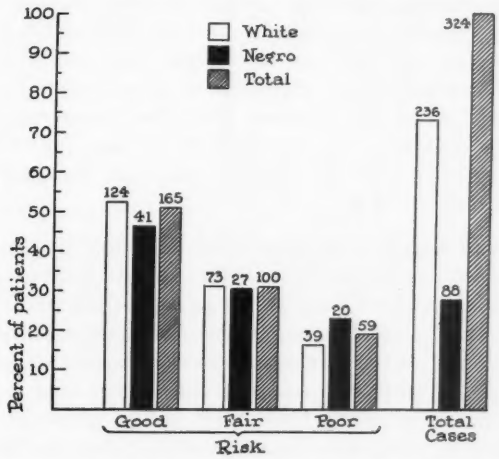


Fig. 5. Proportionate distribution of surgical risk in 236 white and 88 negro patients 60 years of age and over.

The mortalities for these respective groups suggest to a surgeon equally familiar with white and colored patients not the negro's ability to withstand surgery but the negro's tendency to delay in seeking medical aid. There were no deaths, for instance, among the 41 negroes in good condition, no matter what type of surgery was done, although there were three deaths in the 99 white cases in the same category. The figures seem to suggest that the negro, when he encounters surgery on equal terms, so to speak, with the white patient, withstands it quite as well as does the white patient. The trouble is that the terms are so seldom really equal.

An extremely gratifying feature of this analysis is the continuing

improvement in the quality of both preoperative and postoperative care as time advanced. Particularly in the second series the postoperative course was remarkably smooth, even when one might have expected the contrary, because of the frequency of preoperative complications. In the combined series, 57 of the 236 white patients (24.1 per cent) and 17 of the 88 negro patients (19.3 per cent) presented no complications, while 23 of the negro and 37 of the white patients presented only one complication each. But at the other extreme, four white patients, three of whom died, presented seven complications each and four negro patients, two of whom died and all of whom had malignant disease, presented six complications each. Patients with gastrointestinal malignancy and malignancy of the biliary and pancreatic structures were likely to show, in addition to such organic complications as cardiac or renal disease and hypertension, such nutritional complications as severe anemia, cachexia, malnutrition with marked loss of weight, dehydration, hypoproteinemia and avitaminosis. Patients with prostatic disease were likely to show ascending infections and often impairment of renal function. The complications, as might have been expected, were in approximate accord with the surgical risk, and the mortality conformed with both.

The secret of such success as we have been able to achieve in surgery of the aged lies in careful preoperative study to identify these complications, their correction, so far as is possible, and their evaluation and careful medical management when this is not posisble, as it is not, of course, in such conditions as cardiac disease and arteriosclerosis. Full prophylactic and therapeutic use was made of all modern measures, including the liberal use of whole blood, and a good deal of discretion was shown in maintaining the proper fluid balance while at the same time withholding the excess of fluids which might have resulted disastrously in aged persons with cardiorenal complications.

In the single fatality in which preoperative and postoperative care could be described as a failure, it was not for lack of trying. The patient, a 74 year old man with prostatic hypertrophy, had developed catheter intolerance and ascending renal involvement had become serious. He was badly in need of blood before operation, but none that was compatible could be secured, although in the course of his illness more than 50 donors were typed. He bled more than usual at operation, and bled so severely afterward that he had to be taken back to the operating room for additional fulguration. Death was attributed to renal failure, but loss of blood undoubtedly was an important contributing factor.

Causes of Death

No particular racial factors were evident in the distribution of the causes of death. Of the 37 fatalities, the majority, as might have been expected, occurred in the poor risk cases. A renal factor was responsible for the greatest number (fig. 6) and pulmonary embolism for the next greatest number. The latter cause was formerly accepted as unavoidable, unpredictable and inevitable. We are coming to believe that it is none of those things, and it is disturbing to find two deaths from this cause in the 80 cases in the second series, which were treated over the past fifteen months.

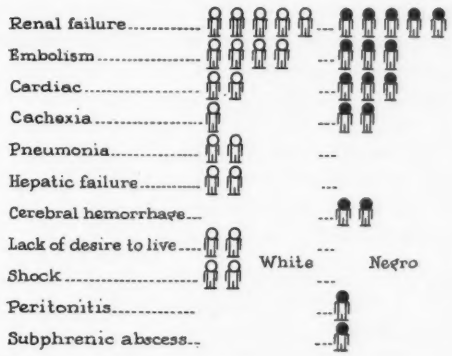


Fig. 6. Distribution of causes of death in 20 white and 17 negro surgical fatalities.

A most regrettable death from this cause occurred in a 60 year old negro woman with carcinoma of the esophagus, in whom many difficulties had been overcome. She had been ill for four months and had lost 50 pounds, but the lesion, although it was adherent to the aorta and the lung was adherent to the pleura, was still resectable. A supra-aortic esophagectomy was done, with esophagastrostomy; intensive therapy brought the patient out of shock, and she was up on the third day. She had been taking soft diet with excellent toleration when the blow fell on the eighth day and she died within a few minutes. The second fatality was even more regrettable because the operation was in the elective group. The patient, who had been submitted to cholecystectomy, choledocholithotomy and choledochostomy, died on the seventh day, within three hours, after she had been up and active for 48 hours. In both cases the legs had been examined regularly, but in neither case had prophylaxis, in the form

of dicoumarol or femoral vein interruption, been practiced. Both deaths, therefore, must be charged against our account.

Although the belief still persists that a patient with cardiac disease is a poor risk for surgery, our experience, like that of many other surgeons, is that with a good internist in charge, this need not be true. The small proportion of deaths from this cause in this series further proves that point.

Not many of the remaining deaths need special comment. The two deaths from pneumonia occurred early in the series. They probably would not have occurred today, even if the disease had developed; with modern methods of prevention, postoperative pneumonia is no longer to be feared, even in older persons. Peritonitis and subphrenic abscess are also becoming increasingly infrequent, with improvements in technique and with modern chemotherapeutic and antibiotic methods of prevention and treatment. The cachexia of malignant disease is almost impossible to overcome in the period of time permissible for preoperative preparation. When a patient no longer desires to live, and has not the will to help the physician, there is not a great deal that the physician can do about it. Many of these older persons, in fact, simply drift away into death because their day is done and they know it.

One of the two patients who died from shock had carcinoma of the stomach with so much involvement that total gastrectomy, splenectomy and subtotal pancreatectomy were required. The other, who had carcinoma of the pancreas, was submitted to the Whipple one-stage operation. Both, I am inclined to think, had too much surgery. On the other hand, without it, their doom was sealed, and from that point of view what was done was perhaps justifiable.

The two patients who died of liver failure, in each instance with an associated renal factor, were white, which is merely accidental, as negroes are not immune to this usually catastrophic development.[5] It is, however, becoming more and more infrequent as surgeons are learning to investigate, before operation, the state of the liver, along with that of the heart, lungs and kidneys. One of the patients who died a liver death had carcinoma of the pancreas. The other, who was operated on with the same diagnosis, proved to have within her peritoneal cavity a veritable Pandora's box of ills, including acute cholecystitis, multiple stones in the gallbladder and ducts, a fistula between the gallbladder and duodenum, pancreatitis and hepatitis. She was exhaustively studied and well prepared before operation and no possible postoperative measure was omitted. The distorted anatomy, in which all landmarks were obliterated, was responsible for the injury of the portal vein, common duct and

right hepatic artery, which occurred at operation, but the advanced state of the pathologic process rather than the technical error probably precipitated the fatal outcome.

In some of these deaths the catastrophe was unexpected and it can fairly be said, unpreventable. In other instances a little more care might perhaps have prevented the fatal outcome. When the cases are examined from the standpoint of correlation between the fatal end-result and the preoperative status it seems that in perhaps 22 of the 37 cases a cause-and-effect relationship existed. In some of these cases, at least, the surgeon was not wholly free from blame. As the facts which have been presented suggest, his index of anticipation of postoperative difficulties must be even higher with aged persons than with younger persons, and with aged negro patients than with aged white patients, though in both races and at all ages, constant vigilance is always the price of success.

Summary and Conclusions

1. Surgical intervention in elderly persons (over 60 years of age) is a matter of constantly increasing concern to the surgeon as the population of this age bracket continues to increase. The surgeon in the South, for this reason, is faced with the special problems of surgery in the aged negro.

2. Factors of mortality have been analyzed in 405 operations performed by a single surgeon on 324 consecutive patients, all 60 or more years of age, and of whom 88 were negroes.

3. The sharp difference in favor of the white race between the mortality rates in white and negro subjects is to be explained by the better surgical risk presented by white patients. Basically, the explanation is the greater tendency of the negro to delay in seeking medical attention.

4. Because of the more serious risks presented by many negro patients, surgery in this upper age bracket in this age must be undertaken with ever greater care than similar surgery in white subjects. Only by the exercise of every precaution can the mortality of surgery in the aged negro be kept parallel with the mortality of surgery in the aged white patient and can the death rates in both races be improved.

REFERENCES

1. Boyce, F. F.: Thyroid Disease in the Southern Negro; A Comparative Analysis of 470 White and 482 Negro Cases from Charity Hospital of Louisiana at New Orleans, Surg., Gynec. & Obst. *70:*761-767 (April) 1940.
2. A Century of Progress in Longevity, Statistical Bull. Metropolitan Life Insurance Company *30:*1-3 (Oct.) 1949.

3. Matas, R.: The Surgical Peculiarities of the Negro: A Statistical Inquiry Based upon the Records of the Charity Hospital of New Orleans, Tr. Am. S. A. *14*:483-610 (June) 1896.
4. Parsons, W. H., and Purks, W. K.: The Elderly Patient as a Surgical Risk; An Analysis of Three Hundred and Twenty-two Operations Performed on Two Hundred and Forty-four Patients Sixty Years of Age and Over, Arch. Surg. *58*:888-904 (June) 1949.
5. Whitaker, H. T., and Parsons, W. H.: The Liver Factor in Unexpected Surgical Deaths. Postgraduate Med., in press.

INVASIVE FIBROUS TUMORS OF THE ABDOMINAL WALL*

ROBERT M. MOORE, M.D.
ED. B. ROWE, M.D.
W. B. KING, JR., M.D.**
Galveston, Texas

Two types of connective tissue tumors which are invasive may arise primarily in the abdominal wall: the desmoid tumor and the fibrosarcoma. In neither case will the exact diagnosis be made with any certainty from physical signs, and even when the surgeon has exposed the tumor at operation he may remain uncertain. Quick sections for microscopic study will be reliable only if the site selected for section happens to reveal the infiltration or invasion of adjacent tissues. In many instances the pathologist will reserve his final judgment until the complete specimen and the permanent microscopic sections have been studied at some length.

Each of these neoplasms gives rise to a firm, rounded, apparently circumscribed mass. Therefore other conditions which may give a firm and rounded nodule or mass in the abdominal wall are pertinent in the differential diagnosis. Although several of the benign mesodermal tumors may be encountered in the abdominal parietes, few are common and only the fibroma is apt to be confused with the tumors named above. The commonest of the benign tumors is the lipoma, a soft tumor. The fibroma and the myxoma are rare while neither the chondroma nor the osteoma would arise in the abdominal wall except under most unusual circumstances. The neurofibroma may occur within the wall although more commonly it is cutaneous. The rhabdomyoma, consisting of striated muscle, rarely occurs in voluntary muscles. Endothelial tumors such as the hemangioma and the lymphangioma are not uncommon in the abdominal parietes but they are usually soft with irregular outline. A number of malignant tumors might enter into differential diagnosis, including the various types of sarcoma, the metastatic carcinoma, and the direct extension from a malignant intra-abdominal or cutaneous neoplasm. Lymph node tumors may be mistaken for fibrous tumors, particularly in the inguinal region. Not uncommonly a firm and relatively circumscribed mass in the abdominal wall suggesting fibrosarcoma or desmoid will prove to be some non-neoplastic tumor, a hematoma, an abscess, a nodule of one of the infective granulomata, or a mass due to reaction about a foreign body.

*From the Department of Surgery, Medical Branch, University of Texas, Galveston.

**Presented during the Houston Assembly of The Southwestern Surgical Congress, September 26-28, 1949.

As an additional point in differential diagnosis, instances will be reported to illustrate the ease with which tumors of the abdominal wall may be mistaken for intra-abdominal tumors.

The Desmoid

Desmoid tumors are hard fibromata which arise from musculofascial structures of the abdominal wall. Some authors consider the term also to include fibromata arising from musculofascial structures elsewhere in the body. The term "desmoid" is derived from Greek words meaning *band* and *appearance*. It was coined by Johannes Müller in 1838 because he was impressed by the dense tendon-like consistency of these tumors.

The desmoid is of surgical interest chiefly because of its tendency to recur after removal and its resemblance to fibrosarcoma in this and several other respects. It is an uncommon tumor. Stewart and Mouat (1924) state that Billroth reported seeing only 16 cases in 23 years and that Nichols reported only 25 cases from the Mayo Clinic for the 16 years 1906 to 1922. Pack and Erlich (1944) reported that during the 26 years, 1917 to 1943, only 17 desmoids of the abdominal wall were seen at the Memorial Hospital while during this period 50,346 cases of neoplastic disease were admitted, an incidence of approximately 1 desmoid to 3,000 neoplasms.

Although the cause of desmoid tumors remains obscure, there are several interesting observations regarding etiology. Between 80 per cent and 90 per cent of desmoids occur in females, and of these females about 80 per cent give a history of having borne one or more children. The age incidence also fits into a pregnancy theory, most of the tumors occurring in the third and fourth decades. It has been suggested that the causative mechanism in pregnancy is trauma at the time of labor, when, during the contractions of the abdominal musculature, the sheath of the rectus muscle or fascia of other abdominal muscles may be ruptured to set up a stimulus for regrowth favoring tumor formation at the point of injury. Other forms of trauma to the abdominal wall may have an etiological significance, as a history of trauma is often obtained from nulliparous patients with desmoid tumors. There have been a number of reports of a desmoid tumor arising in a laparotomy scar, but history of operation is not as common as is history of pregnancy.

Pack and Ehrlich (1944) mention Geschickter's suggestion that desmoid tumors possess the power of concentrating gonadotropic substance, in one instance 13,000 rat units per kilogram having

been found. We know of no other information concerning a sex-endocrine relationship.

It seems that the most likely theory of etiology is one of trauma (injury, surgery, particularly pregnancy) plus a certain predisposition on the part of the patient. This predisposition must be assumed since only a very small minority of women undergoing labor and of individuals receiving other traumata to the abdominal wall develop a desmoid.

As to pathology, in the gross these tumors are hard, fibrous growths which may be circumscribed or diffusely infiltrating. Those which are circumscribed appear to have a capsule, but it is not a true capsule and is probably formed by compression of the surrounding structures or by fibrous reaction formed as a protective barrier against the slowly growing tumor. This pseudocapsule is always penetrated by the tumor cells.

Desmoids characteristically arise from musculofascial structures and invade striated muscle as they grow. The rectus muscle is most frequently involved. The tumors are usually single in number. The tumor grows in the line of least resistance and may protrude into the abdominal cavity even to invade abdominal viscera secondarily, as seen in one case to be reported. Desmoids sometimes reach huge proportions and become densely adherent to iliac crest, symphysis pubis or even transverse processes of vertebrae. They have been known to ulcerate through the overlying skin.

Desmoids cut with a gritting sensation and the cut surface is white and densely fibrous, sometimes with interlacing bands. The surface usually bulges. The microscopic picture is that of a fibroma which is more cellular than the ordinary fibroma and is invading surrounding muscle. Certainly the tumor is made up of rather hyalinized fibrous tissue arranged in interlacing strands and bundles, while peripherally the tumor is more cellular and the cells are intermingled with striated muscle fibers in various stages of degeneration. Some of the degenerated muscle fibers take the form of multinucleated masses similar to foreign-body giant cells. The invasion or infiltration of neighboring striated muscle is the important finding pathologically. It underlies the clinical feature of regular recurrence unless a wide zone of adjacent tissue has been excised with the tumor. In this respect desmoids resemble fibrosarcomata. However, since *lymphatic spread is unknown, and distant metastasis has not been reported*, the tumor is classed as non-malignant by most authorities. Others, such as Boyd (1946), question whether the desmoid's invasiveness and its marked tendency to recur do not justify classifying it as a low-grade fibrosarcoma.

The desmoid may give pressure symptoms and symptoms arising from its weight. It may be discovered accidentally by the patient herself or found by her physician in a routine examination. Usually the tumor grows slowly. Eventual rapid growth has been thought due to myxomatous degeneration leading to hydration rather than to malignant change. If not treated adequately or within a reasonable period of time the tumor may enlarge to involve the entire abdominal wall, to become adherent to bony structures or to invade the peritoneal cavity and the abdominal viscera with distressing results.

The treatment of choice for a desmoid tumor is wide excision *en masse* along with sufficient surrounding tissue to insure removal of all tumor cells which may have invaded beyond the pseudocapsule. The resulting defect in the abdominal wall can then be treated according to the judgment of the surgeon. The regional lymph nodes can be ignored since lymphatic extension has never been reported. The incision must be radical, including a broad zone of the surrounding tissue, for the desmoid recurs with monotonous regularity if excised conservatively. Furthermore, the patient should be cautioned again subsequent pregnancies in view of the high rate of recurrence or second tumor formation which results. The ideal time to treat the desmoid is while it is of a size which will permit radical excision without posing very difficult problems in the repair of the abdominal wall.

It is a curious observation that a large percentage of desmoids respond satisfactorily to radiation therapy. On the basis of their histological makeup one would expect them to be radioresistant. Furthermore, fibromata of musculofascial origin and most fibrosarcomata respond only feebly to irradiation. Pack and Erlich (1944) suggest that the response of desmoid tumors to irradiation may be due to suppression of ovarian function by the irradiation. In support of this theory they state that a small dose of irradiation (1000 to 1500 R) directed to the tumor site does not retard the growth while large doses (5000 R) with the portal including the entire lower abdomen will cause satisfactory regression of the neoplasm. Furthermore, they state that desmoid tumors in males do not respond to irradiation.

There are no reports of desmoids metastasizing either to the regional glands or to distant structures. However, because of the difficulty in differentiating the local tumor from fibrosarcoma at time of operation, it is our opinion that wide surgical excision offers advantages over irradiation. Exceptions are tumors so extensive as to be impossible of excision, in which case x-ray therapy may give satisfactory response.

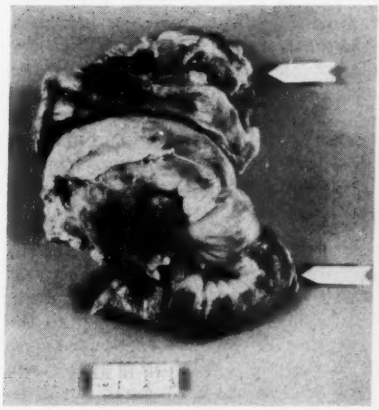


Fig. 1. Desmoid tumor of abdominal wall showing attachment to small intestine.

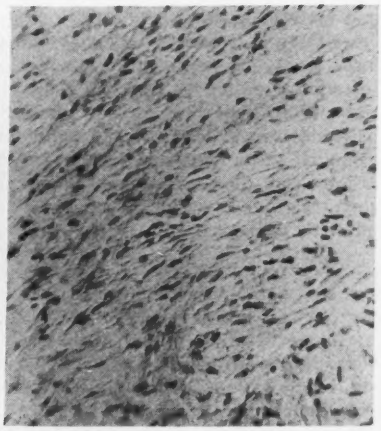


Fig. 2. Microscopic section of central portion of tumor.

Fig. 3. Extension of desmoid into lumen of ileum.

Case Reports

Case 1. Mrs. D. J., aged 28 years, white female, with children 8 and 9 years of age, entered the John Sealy Hospital on June 27, 1949, complaining of a symptomless lump in the right lower abdomen. Two years previously she had undergone a ventral suspension of the uterus through a lower right paramedian incision. Eighteen months following this operation and six months prior to the present admission there had been a single attack of lower abdom-

inal cramps. In the process of feeling her abdomen at that time the patient herself found a lump in the right lower quadrant which had since increased in size but had never become tender. Examination in conjunction with the referring gynecologist revealed a rounded, firm, non-tender tumor just to the right of the upper end of the right rectus scar. It was of the size of a tennis ball and seemed movable and ballotable, giving much the same sensation on examination as a uterine fibroid attached to a mobile uterus. On bimanual examination, however, it was apparent that the mass had no attachment to the uterus. A barium enema showed a large extraintestinal tumefaction lying adjacent to the caecum. All laboratory tests gave normal results.

At operation on June 29, the superficial layers of the old lower right rectus incision were reopened. Immediately upon reincising the anterior sheath of the rectus it became apparent that some of the mass was in the deeper portion of the rectus muscle. Through a second incision considerably medial to the tumor the peritoneum was opened and the tumor was then recognized as a solid tumor of the posterior layers of the abdominal wall jutting posteriorly into the abdominal cavity. It had a covering of parietal peritoneum but at its most posterior aspect appeared attached to the terminal ileum which it was touching. Giving the tumor a margin of fully 4 cm. (2 fingerbreadths) the entire thickness of the abdominal wall (except the unattached skin) was excised to free it. On removing the tumor from the abdomen it lifted out the terminal ileum which was attached to it (fig. 1). A lymph node adjacent to the ileal attachment was removed and quick section revealed that it contained no tumor tissue. Considering the tumor a fibrosarcoma, though mentioning the possibility of desmoid, the terminal 6 inches of ileum along with the ileocecal valve region of the caecum was excised with the neoplasm, and a new end-to-side ileocecal junction was formed slightly higher on the caecum. The abdominal wall could be closed without transplantation of fascia or use of pedicles and this seemed preferable in view of the potential contamination since the large bowel had been opened. After an uneventful convalescence the patient was dismissed from the hospital on the ninth postoperative day and continues to do well at this writing, one year later.

Pathological examination revealed the tumor to be a nonencapsulated desmoid infiltrating the striated muscle of the rectus abdominis (fig. 2) and the smooth muscle of the terminal ileum. The growth had actually penetrated into the lumen of the ileum so that a tumor nodule (fig. 3) could be seen projecting into the lumen of the bowel. A small diverticulum of the bowel lumen extended into the tumor for a depth of 20 mm.: apparently it had a complete mucosal lining. This raised the question as to whether the trauma causing this desmoid had not been the accidental suturing of the terminal ileum to the posterior rectus sheath when the incision was closed at the finish of the operation two years previously.

CASE 2. Mrs. L. B., aged 26 years, white female with children 6, 4½ and 3 years of age, entered the John Sealy Hospital Nov. 21, 1949, complaining of a painful lump in the upper abdominal wall. She had noticed it first four months previously and the lump had enlarged progressively since that time. The pain had amounted to tingling and sensitivity radiating across the abdominal wall. She did not know of having suffered any abdominal trauma. The only significant finding on examination was that there was a firm, movable, indefinite mass about 3 cm. in diameter located in the right rectus abdominis muscle near the costal margin. The mass was slightly tender. No temperature or color changes were evident on external examination. X-ray and laboratory

findings were normal. At operation on December 16, 1949, the nodule was exposed through a transverse incision. It proved to be in the muscle substance, unattached to either anterior or posterior sheath. It was excised *en bloc* and was reported on quick section to be a desmoid tumor. A zone of additional surrounding tissue was excised and it was found on microscopic study to be

Fig. 4. Fragmentation of skeletal muscle in zone of invasion at border of desmoid.

normal muscle. The fascia and skin were closed in layers and the patient was dismissed on an ambulatory status two days later. The microscopic picture is shown in figure 4. It exhibits the fragmentation of skeletal muscle fibers as the result of invasion by the tumor tissue, a characteristic finding in desmoid tumors.

The Fibrosarcoma

Fibrosarcoma, the other invasive fibrous tumor of the abdominal wall, is quite similar to the desmoid in structure and in behavior except in one respect. Fibrosarcoma are prone to recur locally like the desmoid, and similarly to recur repeatedly unless excision is very radical. The clinical course may be rapid or slow depending upon the cellularity of the particular tumor. Early in the course of the highly cellular neoplasms, and later in the case of the more acellular, the fibrosarcoma is subject to a development which is apparently never seen in the desmoid. This is the formation of metastases, distant blood-borne metastases in most instances, regional lymphatic metastases in less than 10 per cent.

There is much lack of agreement regarding the proper classification of the various sarcomata. Some authors attempt to classify

soft tissue sarcoma by indicating the tissue from which it has originated rather than by terms describing the cellular makeup of the tumor. Thus in many quarters the terms neurogenic sarcoma, liposarcoma and myosarcoma have replaced older terms such as spindle-cell sarcoma, myxosarcoma and round-cell sarcoma. Some maintain that the malignant tumors arising from muscle tissue should not be included among sarcomata. Ewing (1928) believed that the majority of soft part sarcomata are of neurogenic origin and one of the most interesting developments in views upon the histogenesis of such tumors has been the agreement by numerous authorities that at least many sarcomata originate from some nerve-sheath element such as the Schwann cell, since they possess the same gross, microscopic and clinical features as do the tumors in patients with manifestations of von Recklinghausen's disease. Ewing, Quick and Cutler (1927), and Stewart and Copeland (1931) are some of the authorities who have furthered this view. Cutler and Buschke (1938) classify soft part sarcomata into three clinical groups: (1) sarcomata associated with one or more signs of von Recklinghausen's disease, (2) sarcomata arising as solitary tumors in deep nerve trunks or at successive intervals along a nerve trunk, and (3) sarcomata not associated with demonstrable evidence of von Recklinghausen's disease and not definitely connected with a nerve trunk. (Von Recklinghausen's disease may be evidenced by the characteristic pigmentation, by multiple tumors along the course of nerve trunks, or by a familial history. There is some evidence of an association between von Recklinghausen's neurofibromatosis and the melanoma, and between neurofibromatosis and multiple lipomata.)

Cutler and Buschke's third group, the soft tissue sarcomata without demonstrable evidence of von Recklinghausen's disease and not definitely connected with a nerve trunk, include the neoplasms to which a variety of terms have been applied: fibrosarcoma, spindle-cell sarcoma, fascial sarcoma and myxosarcoma. Such terms are still used by those who do not believe that their similarity to the tumors of neurofibromatosis is sufficient basis to justify their classification as neurogenic sarcomata.

Fibrosarcoma are fibrous tissue tumors usually arising from subcutaneous or musculofascial structures, but sometimes arising from the skin. About 6 per cent arise in the abdominal wall. Like desmoids these abdominal-wall tumors are uncommon, but they may be seen at any age and in either sex. As with other neoplasms the etiology remains unknown, although it appears that the origin of certain of the tumors is related to some trauma. There is little to prove that either the simple fibroma or the desmoid tumor undergoes malignant degeneration into a fibrosarcoma.

Grossly fibrosarcoma are rounded or nodular and seem to be sharply differentiated from surrounding tissues. Some are highly cellular and vascular and may contain areas of hemorrhage, mucoid degeneration of cyst formation. Such tumors are softer. Others are composed of avascular fibrous tissue and are hard and rubbery. The cut surface of these show interlacing bundles of fibrous tissue. Many fibrosarcomata are encapsulated, but the capsule is usually adherent to adjacent structures, and tumor cells have often penetrated the capsule, particularly at such points of attachment. The tumors expand and invade and often become attached to bone. The overlying skin may become involved and may ulcerate.

Microscopically the fibrosarcomata vary from very cellular anaplastic types with giant cells and areas of hemorrhage and degeneration to fibrogenic tumors difficult to differentiate from fibromata. The microscopic diagnosis may be very difficult. Broders, Hargrave and Meyerding (1938) have presented criteria for malignant grading.

Like the desmoid the fibrosarcomata are relatively nonsymptomatic. Those which develop slowly appear to give the better prognosis. Repeated local recurrence is the rule unless excision is quite radical. Unless completely excised, distant metastases to the lungs, bones, liver or brain are to be expected eventually.

There are at least four mechanisms which may operate to produce local recurrence. Penetration of malignant cells through the capsule is common, although the capsule may appear intact in the gross. Lymphatic spread occurs in only 5 to 8 per cent of cases and then usually late. Multicentric origin of certain tumors may suggest recurrence of a removed tumor, c.f., von Recklinghausen's disease. Lastly, tumor cells may be implanted at the time of surgery.

As to treatment, the facts that many fibrosarcomata are located near the body surface and that many grow slowly by expansion and metastasize late, favor surgical removal. When possible, wide surgical excision *en masse* tends to be the treatment of choice. Local recurrence appears to predispose to metastasis, hence the first surgical excision should be radical. Often the quick or frozen section gives an erroneous impression of a benign tumor, and Bigger (1947) states that if a tumor thought to be benign is removed and later found to be fibrosarcoma, the tissues surrounding the site of removal should be excised radically without waiting to see if recurrence takes place. Similarly, Bigger advocates radical excision in the case of recurrence, but believes that the incidence of lymphatic spread is so slight that the regional lymph nodes need not be resected unless there is physical evidence of their involvement.

Fig. 5. Original appearance of fibrosarcoma in Case 3. (1927)

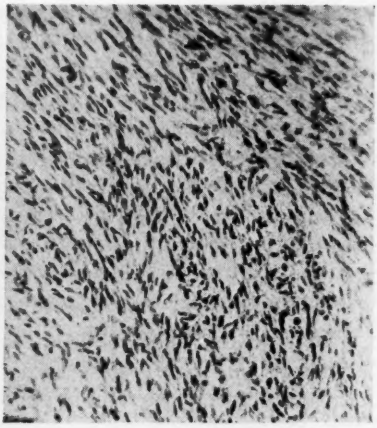
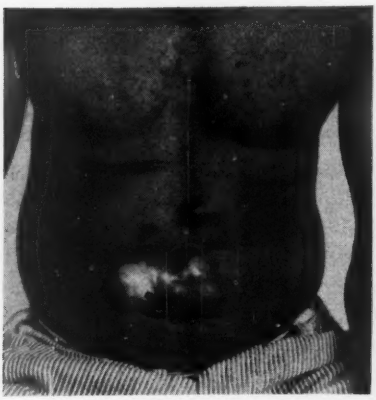


Fig. 6. Microscopic appearance of tumor, Case 3.



Figs. 7 & 8. In 1934 Case 3 exhibited his third recurrence of fibrosarcoma.

Irradiation alone has been uncertain in controlling fibrosarcoma though regression of the tumor does occur in some cases. A good many surgeons advocate irradiation postoperatively as an adjunct to surgery.

Case Reports

Case 3. C. S., a negro male, aged 30, was admitted to the John Sealy Hospital in October, 1927, with a nodular tumor of about one year's duration located in the right hypochondrium, 15 by 9.5 by 5.5. cm. (approximately 6 by 4 by 2 in.) extending from the right costal margin to the umbilical level (fig. 5). It extended above the surface of the abdominal wall and was firm and nodular except for several soft areas. It was movable to some extent

Fig. 9. Case 3: Postoperative healing delayed by excessive radiation (1935).

Fig. 10. Case 3: Appearance of abdominal wall in 1944, ten years after excision of the third recurrence of fibrosarcoma.

when the abdominal muscles were relaxed. At operation the tumor was found to be attached to the rectus fascia. It was removed conservatively. Pathological examination showed it to be a fibrosarcoma (fig. 6).

The patient was next seen in May, 1930, two and one-half years later, at which time there was local recurrence. At operation two months later a firm, nodular mass the "size of a grapefruit," involving the scar of the first operation, was excised along with the rectus muscle and its anterior and posterior sheaths, transplant of fascia lata from the right thigh being used to close the defect.

Just under three years later, in April, 1933, the patient was again admitted with recurrence. A soft tumor mass 3 by 2 cm. in the center of the abdominal scar was excised and found to be recurrent tumor.

In September, 1934, seven years after his original operation, the patient was readmitted with his third local recurrence. This was a firm, nodular mass 10 by 5 cm. in the center of the old scar (figs. 7 and 8). It seemed attached and immobile. At this time the patient came under the care of one of us with the advice of Dr. A. O. Singleton that treatment was useless unless it was very radical and that postoperative irradiation might be of help. At operation a very large oval of the entire thickness of the abdominal wall was excised, a transverse oval reaching from the xiphoid above to the level of the former umbilicus below. A very large graft of fascia lata was taken from the left thigh but in order for it to bridge the defect it was necessary at the operating table to lessen the gap by flexing the patient's thighs toward his chest. The skin was approximated with the aid of two transverse relaxing incisions, one on the anterior chest wall and one across the lower abdomen. For many months the patient walked bent over in a flexed position. Following operation the patient received 300 mg. hrs. of radium to each of 27 one-inch squares on the epigastric wall. Confusion arose from changing personnel so that a large area was overtreated, resulting in a superficial ulceration requiring a year to

heal (fig. 9). Probably the excess of irradiation was responsible for some of the acute intestinal obstructions which followed, for at subsequent laparotomies the bowel showed marked reaction with dense fibrous adhesions.

The patient was operated upon for acute intestinal obstruction one year later and for ventral hernia two years later. During the next eight years there were several admissions for threatened intestinal obstruction (fig. 10). Finally, in September, 1944, 17 years after his first operation for fibrosarcoma and 10 years after the fourth operation for the third recurrence of the fibrosarcoma, and without evidence of recurrence in the intervening 10 years, the patient entered with threatened intestinal obstruction and bilateral bronchopneumonia. He died two days later without additional surgery. Postmortem examination revealed bilateral bronchopneumonia and intestinal obstruction as causes of death. A thorough autopsy revealed no evidence of recurrence of the sarcoma.

This fibrosarcoma must certainly be classified as low-grade in the sense that it showed no tendency to metastasize, even though it recurred locally three times in seven years. The fact that, after three recurrences, a very radical fourth excision followed by irradiation resulted in a 10 year cure should encourage one greatly in dealing with this type of tumor.

CASE 4. In March, 1944, a 29 year old soldier came under the care of one of us in the University of Texas 127th General Hospital in England. He had noted for several months that he had a tumor in the abdomen to the right and below the umbilicus. Examination revealed a movable intra-abdominal tumor the size of a tennis ball; it seemed ballotable or floating like a uterine fibroid in the female. Gastrointestinal x-rays were negative but the pyelogram showed a semicircular medial deviation of the right ureter at this level. An exploratory laparotomy on April 1, 1944, revealed the mass to be a fibrosarcoma arising from the posterior rectus sheath and jutting into the abdomen. It was dumbbell in shape, one sphere lying in the posterior abdominal wall and one in the abdominal cavity but not crowding the ureter, the deviation of the latter apparently being purely coincidental.

The tumor was removed radically by excising a large circle of the entire thickness of the abdominal wall giving the sarcoma a wide berth. The abdominal portion had attached to the tip of the omentum and a large piece of omentum was excised with the tumor. The abdominal wall was closed with the aid of a large patch of fascia lata.

Microscopic study revealed that the tumor was highly cellular with sheets of anaplastic cells, some round, some spindle shaped and some polyhedral, with little cytoplasm, large nuclei and dozens of mitotic figures. It was classed as a sarcoma of mesoblastic origin without further commitment as to histogenesis.

The soldier was sent to the United States a few weeks later with microscopic sections accompanying him. A follow-up card was received from Lawson General Hospital at Atlanta six weeks later stating that he had been discharged to the Veterans Administration apparently well, having been given 1800 R of x-ray therapy before discharge. On studying the slides it was agreed that the lesion was sarcoma though their pathologist thought it was probably "adeno" sarcoma, perhaps referring to the sarcoma with both connective tissue and epithelial elements found not uncommonly in the female breast. We have no further follow-up information upon this patient, but because of the cellularity of the tumor one presumes that the prognosis was

poor in comparison to the other case of sarcoma reported. Whether the neoplasm represented a very anaplastic fibrosarcoma or some other type of sarcoma we do not know. At least it was invasive and fibrous clinically.

Summary

In summary, it does not seem particularly unfortunate that desmoid tumors and fibrosarcomata of the abdominal wall have many similarities and are easily confused with one another, both at the operating table and on "frozen" section. In both instances a very wide surgical excision of the entire thickness of the abdominal wall apparently accomplished all one can accomplish surgically. Very radical surgical extirpation giving the tumor mass a wide berth is indicated in both instances. Even in the fibrosarcoma it is only exceptionally that the regional lymph nodes enter the problem.

Careful study of "permanent" sections by an experienced pathologist usually suffices to differentiate the fibrosarcoma and the desmoid. Postoperative irradiation can be used depending upon the merits of the individual case, both the cellularity of the tumor and the surgeon's satisfaction as to the extensiveness of his excision being pertinent in the decision. In view of the difficulty in differentiating the rare benign fibroma from these two invasive lesions it is best for the surgeon to perform a very radical local excision when he encounters any firm, fibrous neoplasm about the fasciae or musculature of the abdominal wall.

In concluding, we wish to emphasize the ease with which tumors of the abdominal wall may be confused with intra-abdominal tumors. In 1942 at the Station Hospital at Camp Bowie, Texas, a middle-aged army sergeant presented himself with a hugh, elongated tumor mass emerging from beneath the left costal margin and descending to the left mid-abdomen. It seemed too soft to represent an enlarged kidney or spleen. All laboratory and x-ray studies were indeterminate except that a radiologist present pointed out that the tumor gave less shadow than the normal intestinal loops about it. Having prepared for an heroic operation under the impression that the mass represented a high intra-abdominal tumor of unknown type, it was a happy anticlimax for the operation to prove a short and minor one. The tumor was an immense lipoma lying between the internal oblique muscle and a thinned-out transversus abdominis muscle, virtually the entire mass jutting posteriorly into the abdominal cavity. No one who had examined the patient had suspected that the tumor was located within the abdominal wall.

Two of the four invasive fibrous tumors reported at this time were mistaken for intra-abdominal tumors. In each instance the

tumor gave the impression of floating in the abdominal cavity, of exhibiting ballottement, resembling a fibroid attached to a movable uterus. In the case of the desmoid the x-ray examination gave the impression that an intra-abdominal tumor was pressing against the caecum. In the second fibrosarcoma reported, the coincidence of the ureter deviating in a semicircular manner at the level of the tumor suggested that the tumor was retroperitoneal. One can only conclude that it would be well to remember that tumors arising in the posterior layers of the abdominal wall, deep to the stronger fascial and muscular layers, may effect practically their entire enlargement by protruding into the abdominal cavity rather than toward the surface of the abdominal wall, and may very easily be mistaken for tumors of intra-abdominal origin.

BIBLIOGRAPHY

1. Bessesen, D. H.: Desmoid tumor of the abdominal wall, Am. J. Surg. *16:*513-514 (June) 1932.
2. Bigger, I. A.: The treatment of fibrosarcoma, South. M. J. *40:*392-401 (May) 1947.
3. Bloodgood, J. C.: Diagnosis and treatment of borderline pathological lesions, Surg., Gynec. & Obst. *18:*19-34, 1914.
4. Boyd, W.: Surgical Pathology. Philadelphia: W. B. Saunders Company, 1946.
5. Brewer, G. E.: Typical fibromyoma of the abdominal wall following hysterectomy, Ann. Surg. *74:*364-367 (Sept.) 1921.
6. Brockman, D. D.: Congenital desmoid of the abdominal wall, J. Pediat. *31:*217-219 (Aug.) 1947.
7. Broders, A. C.; Hargrave, R., and Meyerding, H. W.: Pathological features of soft tissue fibrosarcoma, with special reference to grading of its malignancy, Surg., Gynec. & Obst. *69:*267-280 (Sept.) 1939.
8. Carroll, G. A., and Martin, T. M.: Fibrosarcoma of the extremities, S. Clin. North America *24:*1220-1227 (Oct.) 1944.
9. Carroll, W. W.: Principles involved in surgical therapy of "encapsulated" fibrosarcoma of soft tissues, Surg., Gynec. & Obst. *84:*703-709 April (No. 4A) 1947.
10. Cullen, T. S.: Surgical diseases of the umbilicus, J.A.M.A. *56:*391-397 (Feb. 11) 1911.
11. Cutler, M., and Buschke, F.: Cancer, Its Diagnosis and Treatment. Philadelphia: W. B. Saunders Co., 1938.
12. Ewing, J.: Neoplastic Diseases. Philadelphia: W. B. Saunders Co., 1928, ed. 3.
13. Geschickter, C. F., and Lewis, D.: Tumors of connective tissue, Am. J. Cancer *25:*630-655 (Nov.) 1935.
14. Green, C. C.: Desmoid tumor, Arch. Surg. *50:*304-306 (June) 1945.
15. Meyerding, H. W.; Broders, A. C., and Hargrave, R. L.: Clinical aspects of fibrosarcoma of the soft tissues of the extremities, Surg., Gynec. & Obst. *62:*1010-1019 (June) 1936.
16. Pack, G. T., and Ehrlich, H. E.: Neoplasms of the anterior abdominal wall with special consideration of desmoid tumors, experience with three hundred and ninety-one cases and collective review of the literature, Internat. Abst. Surg. *79:*177-198, 1944. In Surg., Gynec. & Obst., Sept. 1944.
17. Pack, G. T., and Sunderland, D. A.: Naevus unius lateris, Arch. Surg. *43:*341-375 (Sept.) 1941.
18. Pearman, R. O., and Mayo, C. W.: Desmoid tumors; A clinical and pathological study, Ann. Surg. *115:*114-125 (Jan.) 1942.
19. Quick, D., and Cutler, M.: Neurogenic sarcoma; clinical and pathological study, Ann. Surg. *86:*810-829 (Dec.) 1927.

20. Stewart, F. W., and Copeland, M. M.: Neurogenic sarcoma, Am. J. Cancer, *15:*1235-1320 (July) 1931.
21. Stewart, M. J., and Mouat, T. B.: Fibroma of the abdominal wall, Brit. J. Surg. *12:*355-377 (Oct.) 1924.
22. Warren, S., and Sommer, G. N. J., Jr.: Fibrosarcoma of the soft parts, with special reference to recurrence and metastasis, Arch. Surg. *33:*425-450 (Sept.) 1936.
23. Watson, W. L., and McCarthy, W. D.: Blood and lymph vessel tumors; a report of 1,056 cases, Surg., Gynec. & Obst. *71:*569-588 (Nov.) 1940.
24. Wilson, D. A.: Tumors of the subcutaneous tissue and fascia, with special reference to fibrosarcoma—a clinical study, Surg., Gynec. & Obst. *80:*500-508 (May) 1945.
25. Wiper, T. B., and Miller, J. M.: Desmoid of the anterior chest wall, Am. J. Surg. *71:*556-557 (April) 1946.

TREATMENT OF PERITONITIS OF APPENDICEAL ORIGIN WITH AUREOMYCIN*

GEORGE H. YEAGER, M.D.,
WILLIAM D. LYNN, M.D.
THOMAS G. BARNES, M.D.
Baltimore, Md.

AUREOMYCIN,** an antibiotic derived from a strain of *Streptomyces aureofaciens,* is rapidly becoming established as a potent therapeutic agent. It is a fairly soluble substance with an acid pH. It deteriorates rapidly in alkaline solution. One of its advantages is that it can be effectively administered by the oral route. It is absorbed rapidly and a prompt therapeutic blood level is attained and maintained at a rather constant level for 12 or more hours.[1] Antibacterial amounts of the material diffuse readily into the cerebrospinal fluids, pleural fluids, bile and peritoneal fluids, following the administration of effective therapeutic dosage. It is constantly excreted by the kidneys and a high concentration in the urine may be developed in 2 to 16 hours after administration. There appears to be no "piling up" of the antibiotic in the serum.[1]

It has been found to be bacteriostatic as well as bactericidal for a number of important Gram negative and Gram positive microbes.[2] It is of considerable practical importance that many penicillin resistant and streptomycin resistant, as well as streptomycin dependent organisms, are susceptible to its action.

A study in the laboratories of this clinic by Yeager et al.[3,4] revealed a 90 per cent survival rate in dogs treated with aureomycin after the production of experimental peritonitis. Other noteworthy observations in these studies were lack of toxic reaction and a tendency to effect localization of peritoneal infection.

This report comprises a series of 39 cases of peritonitis, secondary to appendicitis, treated with aureomycin. Thirty-five of these cases had prompt surgical treatment. Three of the 4 cases without operative intervention subsequently had interval appendectomies. For purposes of discussion, the cases will be divided into two groups: (1) operative and (2) non-operative.

The mortality rate for the entire series was zero. Bacteriological cultures of the peritoneal exudate were positive in all operative

*From the Department of Surgery, University Hospital, Baltimore, Maryland.

**Aureomycin in this study was supplied by Lederle Laboratories Division, American Cyanamid Company.

Presented during the Washington Assembly of The Southeastern Surgical Congress, March 6-9, 1950.

cases. This was considered a necessary criterion for inclusion in this study. Cases of negative bacteriological cultures are not included. The authors believe that in this type of study, a diagnosis of peritonitis must be confirmed by positive bacteriological cultures.

From a bacteriological viewpoint, the most common offending organism found in peritonitis of appendiceal origin is *Escherichia coli*.[5] Usually it is found in association with other organisms. Table I shows the over-all incidence of offending organisms in this series.

TABLE I

Bacteriological cultures from peritoneal exudate of thirty-five operative cases.

Escherichia coli	22
Gamma streptococcus	9
Streptococcus viridans	5
Clostridia perfringens	4
Beta-hemolytic streptococcus	3
Pseudomonas pyocyaneus	3
Staphylococcus albus	3
Proteus vulgaris	1
Bacillus alcaligenes	1

In the initial phases of this study, 25 mg. of aureomycin per pound of body weight per 24 hours was used. When it became apparent that toxic manifestations were practically nil, an initial dose of 3 Gm. was given orally, and then followed by 250 mg. every four hours. Children are now given 1 to 2 Gm. orally, and 250 mg. every four hours.

The mode of administration occasionally presents a problem. The most satisfactory and simplest method of administration is per os. Intubated patients were administered aureomycin by instilling it in an aqueous solution of approximately 100 cc. Following each instillation, the tube was clamped off for at least one hour.

Dissolving the drug in two ounces of Coca-Cola syrup proved a most efficacious vehicle for small children. We have, on occasions, administered the drug as a cottonseed oil retention enema with satisfactory absorption.

Recently, a preparation of aureomycin has been developed which can be administered intravenously. It should be given rapidly through a No. 17 or No. 18 intravenous needle, in a proportion of 1.0 Gm. to 500 c.c. of physiologic saline solution.

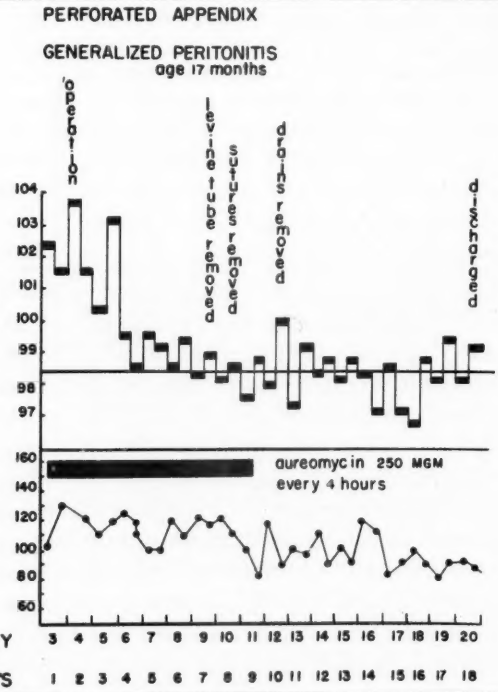
A dose of 0.5 Gm. of aureomycin administered intravenously will give satisfactory therapeutic concentrations in the serum for at least

12 hours. This is suggested as the optimal intravenous dose for adults.[6]

Patients unable to take the drug orally should have single intravenous injections of 0.5 Gm. of aureomycin every 12 hours. Repeated injections will produce venous irritation and thrombosis. The veins of the lower extremities should not be used. It is inadvisable to use intravenous aureomycin therapy for more than two or three days.

TABLE II

Typical temperature chart of a patient with generalized peritonitis treated with aureomycin.



Toxic manifestations, which have been almost negligible, may be seen in the form of nausea and vomiting. Early in this series, an incidence of nausea and vomiting was noted in about 75 per cent of the cases. This apparently was the experience of most observers. More recently a purer product has been developed with consequent reduction in the incidence of nausea. Administration of an alumi-

num hydroxide preparation, 15 to 30 minutes before each dose of aureomycin, reduces the incidence of gastrointestinal complaints.

A marked improvement in the general appearance of the patient is usually noted during the first 24 hours of aureomycin therapy. This improvement is usually striking but not necessarily correlated with a drop in temperature. Very frequently, on the second or third day of treatment, when the temperature appears to be falling, a sudden spike of 1.5 F. to 2.0 F. is noted. It is of short duration, usually lasting from 24 to 48 hours. This phenomena has been termed a minerette by Woodward.[7] Table II demonstrates a typical temperature chart of a patient with generalized peritonitis treated with aureomycin.

Operative Cases—Aureomycin Therapy

Eighteen of the operative cases had a generalized peritonitis and 17 had a localized type. In this group of operative cases, the appendix was removed in all but two instances. In these two exceptions, one of which was a generalized peritonitis, and one a localized peritonitis, simple drainage was the operative procedure. Subsequently, each of these patients had an interval appendectomy.

All of the cases of generalized peritonitis were drained. Sixteen of the 17 cases of localized peritonitis, including one in which the appendix was not removed, were drained. *Escherichia coli* was cultured in 13 out of 18 cases of generalized peritonitis, and in 9 out of 17 cases of localized peritonitis. Tables III and IV give a summary of these groups with bacteriological cultures. A typical case report from each group follows.

TABLE III

Localized Peritonitis. Immediate operation with removal of the appendix in 16 cases. Drainage established in 16 cases. Twenty-four positive bacteriological cultures.

No. of Cases	Age Range	Average Hospital Days	Mortality
17	2.5-71	11	0

Escherichia coli	9
Gamma streptococcus	6
Streptococcus viridans	2
Clostridia perfringens	2
Beta-hemolytic streptococcus	2
Pseudomonas pyocyaneus	1
Staphylococcus albus	2

TABLE IV

Generalized Peritonitis. Immediate operation with removal of the appendix in 17 cases. Drainage established in all cases. Twenty-seven positive bacteriological cultures.

No. of Cases	Age Range	Average Hospital Days	Mortality
18	1.5-62	14.3	0

Escherichia coli	13
Gamma streptococcus	3
Streptococcus viridans	3
Clostridia perfringens	2
Beta-hemolytic streptococcus	1
Pseudomonas pyocyaneus	2
Staphylococcus albus	1
Proteus vulgaris	1
Bacillus alcaligenes	1

Localized Peritonitis

Case 28066. J. R., white male, aged two and one-half years, was admitted to the University Hospital with a history of vomiting, restlessness and fever of five days' duration, and abdominal pain of 24 hours' duration. Admission examination revealed a toxic and acutely ill child; temperature 101 F., pulse 120, respirations 28. The abdomen was quite distended and there was marked tenderness and muscle spasm over the entire right side. The abdomen was silent. Rectal examination revealed tenderness in the right pelvis. Leukocyte count was 14,900. Under vinethene ether anesthesia, and with a McBurney incision, a perforated, gangrenous appendix with a localized peritonitis was found. The appendix was removed with invagination of the stump, and the abdomen was closed without drainage. Subsequent peritoneal exudate cultures revealed *Escherichia coli, Beta hemolytic streptococcus* and *Pseudomonas pyocyaneus.* Patient was given 1 Gm. of aureomycin orally, initially, and 250 mg. every four hours, for six days. After a benign postoperative course, he was discharged on the tenth postoperative day.

Generalized Peritonitis

Case 25819. B. G., white female, aged 17 months, was admitted to the University Hospital with a history of having been treated for one week with sulfadiazine and kaopectate because of diarrhea and a middle ear infection. Twenty-four hours prior to admission, the mother stated that the child developed severe cramplike lower abdominal pain. These episodes lasted from two to three minutes. Vomiting was present but was not a prominent feature in the clinical history. Admission examination revealed a rectal temperature of 102 F., pulse 100 and respirations 35. The child appeared to be in acute distress. She was moderately dehydrated and acidotic. The abdomen was markedly distended. There was diffuse abdominal tenderness, more marked in the right lower quadrant and associated with muscle spasm. No masses could be palpated. Peristaltic sounds could be heard. Rectal examination revealed no masses. Laboratory examination—hemoglobin 75 per cent, leukocyte count 19,300, CO_2 combining power 34.7 mg. per cent or 15.5 milliequivalents.

Roentgenological examination of the abdomen revealed diffuse gaseous distention of the intestinal tract. Gastric suction was initiated. To restore her acid-base equilibrium, parenteral fluids were given. Five hours after admission, under vinethene ether anesthesia and with a McBurney incision, a diffuse, purulent peritonitis was revealed. A large amount of foul-smelling pus, which had gravitated to all quadrants of the abdomen, was evacuated. The appendix, which was gangrenous and perforated, was bound down by numerous adhesions. It was deemed inadvisable to remove the appendix. Drainage was established with Penrose drains. Subsequent bacteriological cultures revealed *Escherichia coli* and *viridans streptococcus*. She was given 500 mg. of aureomycin immediately, postoperatively, and 250 mg. every four hours for seven days by intubation. Oral medication, 250 mg. every four hours, was continued for two more days. The postoperative course was most uneventful, with discharge from the hospital on the seventeenth postoperative day. She was readmitted five months later and an interval appendectomy was performed. No adhesions were encountered and the appendix appeared grossly normal. Her second postoperative course was uneventful with discharge from the hospital on the seventh postoperative day. In view of the pathology visualized, it is of clinical interest that the subsequent pathological report was "chronic appendix."

Nonoperative Cases

Four patients in this study with clinical evidence of an acute inflammatory reaction in the peritoneal cavity were treated with aureomycin and nonsurgical intervention. In each instance, the history and objective findings suggested a diagnosis of spreading peritonitis secondary to appendicitis. Three of these patients subsequently had interval appendectomies, with confirmatory evidence of the correctness of the initial diagnosis. Table V summarizes this group. A typical case history follows:

TABLE V

Nonoperative Cases. Three cases subsequently had interval appendectomies.

No. of Cases	Age Range	Average Hospital Days	Mortality
4	4-56	11	0

Case 28045. P. G., negro female, aged 23. Admitted to the obstetrical service one week following a normal home delivery of a full term, living baby. Admission complaint was abdominal pain of one week's duration. The onset was in the epigastrium with migration to the right lower quadrant and increasing severity. A history of chills and fever was given but no history of nausea or vomiting. Admission diagnosis was parametritis. Surgical Consultation: Temperature 101 F., pulse 90 with positive findings limited to the abdomen. The fundus of the uterus which was palpable 2 fingerbreadths below the umbilicus, was firm and nontender. A mass, the approximate size of a baseball, was palpated in the right lower quadrant. It was acutely tender, smooth, tense and fixed. It appeared to be distinctly separate from the uterus and

adnexa. Pelvic examination was performed by an obstetrician who reported that the right tube and ovary could easily be felt and were not involved in the inflammatory reaction. A diagnosis of perforated appendix with abscess formation was made. She was given an initial dose of 2 Gm. of aureomycin orally, and 500 mg. every four hours for four days. After 24 hours, her temperature was normal, and clinically she showed marked improvement. In five days the mass had completely regressed with minimal right lower quadrant pain and tenderness. She was discharged on the seventh day after admission. Three months later, following several episodes of nausea and right lower quadrant pain, she was readmitted and an exploratory laparotomy performed. The appendix, which was free of adhesions, was removed. The tubes and ovaries were normal. No evidence of a previous inflammatory reaction was discernible. There has been no recurrence of symptoms. The pathological report was chronic appendicitis.

Comment

The average number of hospital days was 12.0 days for the entire series. In a comparable group of cases collected from the University Hospital files treated with streptomycin, sulfadiazine, or penicillin alone or in combination, the average hospitals stay was 18.5 days (Table VI).

TABLE VI

Comparison of average age and hospital days of patients treated with other antibiotics and with aureomycin.

Antibiotic	Average Age	Average Hospital Days
Penicillin, Streptomycin, Sulfadiazine, etc.	35.4	18.5
Aureomycin	25.0	12.0

Summary and Conclusions

1. The clinical applicability of aureomycin in the treatment of peritonitis is reviewed.

2. A series of 39 patients is presented as evidence of the effectiveness of aureomycin in the treatment of peritonitis secondary to appendicitis.

3. Because of the wide antibacterial range of aureomycin, it should prove to be invaluable in the prophylaxis and treatment of peritonitis.

REFERENCES

1. Altemeier, W. A.: Newer Antibacterial Agents in Surgery, S. Clin. North America *29*:1285-1300 (Oct.) 1949.

2. Herrell, W. E.: Observations on the Clinical Use of Aureomycin, Proc. Staff Meet., Mayo Clin. *24*:612-618 (Dec. 7) 1949.

3. Yeager, G. H.; Ingraham, C. H., and Holbrook, W. A., Jr.: Comparison of Effectiveness of Newer Antibiotics in Experimental Peritonitis: A Preliminary Report, Ann. Surg. *129:*797-809 (June) 1949.
4. Yeager, G. H.; Byerly, W. L., Jr., and Holbrook, W. A., Jr.: Streptomycin, Aureomycin and Chloromycetin; Experimental and Clinical Comparison, Ann. Surg. *130:*576-588 (Sept.) 1949.
5. Altemeier, W. A.: Inactivation of Penicillin by Various Gram Negative Bacteria, Surg., Gynec. & Obst. *81:*379-383 (Oct.) 1945.
6. Randall, R. V.; Taylor, R. W., and Wellman, W. E.: Intravenous Administration of Aureomycin Including Studies on the Concentration in the Serum, Proc. Staff Meet., Mayo Clin. *24:*605-611 (Dec. 7) 1949.
7. Woodward, T. E.: Chloromycetin and Aureomycin; Therapeutic Results, Ann. Int. Med. *31:*53-82 (July) 1949.

TWO TYPES OF PLASTIC OPERATIONS OF PARTICULAR INTEREST TO THE GENERAL SURGEON

HARRY LEE CLAUD, M.D.
Washington, D. C.

TIME limitations do not permit even short summarized discussions of the many types of plastic surgery with which the general surgeon is justly and deeply concerned. My observations will not include skin grafting for burns, releasing of scar contracture, removal of painful scars, or the correction of other deformities. Rather, I will confine my remarks to the consideration of two types of plastic operations which are of particular interest to the general surgeon, namely:

1. Mammoplasty for hypertrophy of the female breast; and
2. Construction of artificial vagina for congenital absence.

PART I

MAMMOPLASTY FOR HYPERTROPHY OF THE BREAST

The general surgeon, due to the nature of his extensive background in the treatment of pathological lesions of the breast, is qualified to make a careful selection of cases that are to receive reconstructive operations. This careful selection of cases is a fundamental factor in plastic operations for hypertrophy of the breast. One would certainly hesitate doing plastic surgery in a case where a simple amputation would be the more advisable and more humane. Thus, the latter course might be deemed the more expedient in cases of extensive fibrocystic disease and advanced ductal epithelial hyperplasia, which is considered by Warren Cole[1] to be precancerous. However, certain small areas of fibrocystic disease or benign tumors would not contraindicate operation, after a frozen section proved them to be benign. Then, the technic used can be varied to include the removal of these areas, together with a reconstruction of the breast.

There is little need today to justify plastic surgical procedures on the painful pendulous breast. This field is as vital as any other type of surgery which may be needed for relief of pain or restoration of normal active life.

Many of these enlarged breasts are painful. Also, they may very possibly become of such proportions that they cannot be well sup-

Presented during the Washington Assembly of The Southeastern Surgical Congress, March 6-9, 1950.

ported by any apparatus yet devised. They produce pain, general tiredness, backache, and faulty posture. Social activities and healthy sports are impossible to the afflicted. Riding, swimming and dancing becomes increasingly beyond the pale. All clothing has to be tailored and fitted. These undesirable symptoms and limitations of normal activities give rise to a very definite psychological disturbance.

The best patient, in this instance, is an informed patient. Not only should she be told the possible advantages which could follow from a successful operation; she must be acquainted with other foreseeable consequences. The operative procedure should be fully discussed with the patient. The nature of scars should be shown to her by photographs, when possible, so that she might be completely aware of what the end result would be. The complications to be feared should also be fully explained to the patient before operation. In this explanation it should be emphasized that, in the extreme pendulous breast, more than one operation may be required. It should also be given equal emphasis in this explanation that a remote possibility exists of it becoming necessary to do a simple mastectomy.

According to Sir Harold Gillies and Archibald McIndoe[2] of London, mammary hypertrophy may be divided into five classes: (a) Long, heavy pendulous breasts with hypertrophy of the most dependent glandular portion. Characteristic of the adolescent girl of otherwise normal build. This is probably endocrine in type. (b) Broad, heavy breasts associated with obesity and aggravated by pregnancy. This is probably of more complex endocrine origin. (c) Sac-like dependent breasts following obesity reduction of the second variety or multiple pregnancies in the first. (d) True gynecomastia. Marked hypertrophy of the glandular elements of the breast results in some of enormous proportions. These cases are not common, but are purely glandular in origin and are related to the first type. (e) Asymmetry.

A number of operations have been devised for reconstruction of the breast. My early technic followed in principle that of Gillies and McIndoe.[2] An exhaustive and well illustrated review of the various operations has been published by Beisenberger;[3] and more recently by Thorek,[4] May,[5] Aufricht[6] and Bames.[7] Since each method has advantages and disadvantages, and since no single procedure is applicable to all cases, it is advisable for the surgeon to study the various methods to determine which approach best fits the particular case.

The chief purpose in the different technics is to reduce the size of

the breasts. This purpose should be accomplished without jeopardizing the blood supply to the nipple and areola.

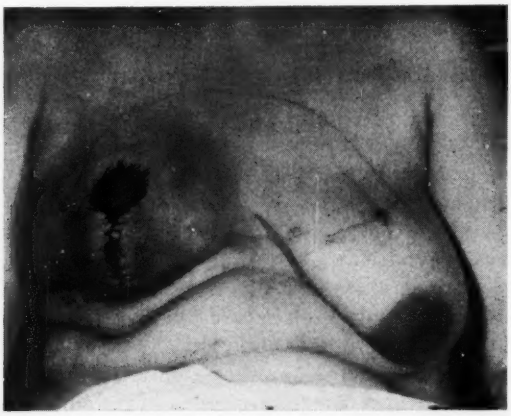


Fig. 1 E. G. Shows right breast completely reduced at one operation, thus giving a fair comparison in reduction in size of the breast and at the same time removing cystic areas. Left breast, to be done later, shows markings for position of nipple and areola. In neither of the cases involving older women was further reduction required nor was correction of scars needed. Figs. 3-4.

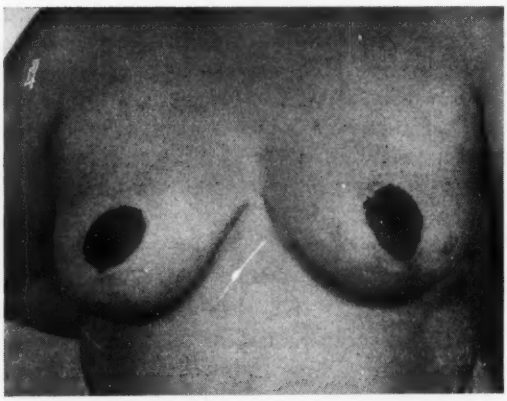


Fig. 2 E. G. Same patient as fig. 1, follow up, four years later.

In some cases of extreme hypertrophy and pendulous breasts two operative procedures may be required: Stage 1. Placing of nipple and areola and partial reduction in the size of the breasts; and Stage 2. Further reduction with correction of scars. A word of caution is necessary here since the complications of necrosis and

sloughing have followed in those cases where the operator has been overly ambitious in making too classically shaped breasts with a single operative procedure.

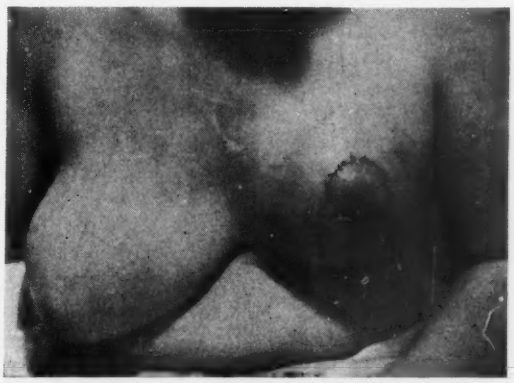


Fig. 3 R. B. One breast done at a time.

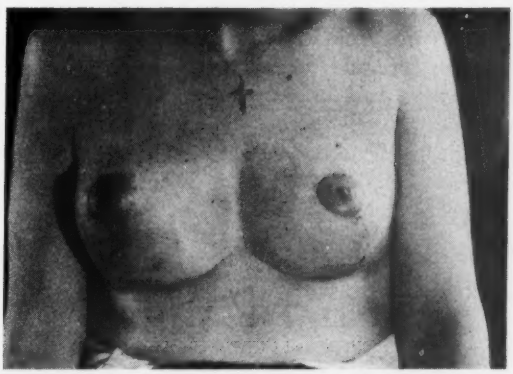


Fig. 4 R. B. One breast done at a time. Right breast was done one week later and photographed just after sutures were removed from right breast. Note slight difference in size, due to the more recent postoperative congestion in the right breast.

The postoperative care of these patients is most important because they will have undergone a long surgical procedure if both breasts are done at the same time. It is desirable to have both breasts done at the same time, in numerous instances, to save the patient the cost of two operations; and to assist the surgeon in his task of making both breasts alike. However, if the nipple areas are well marked out by skin scratching, and if the operator has had

experience in reducing methods, he may elect to do one breast at a time.

Such was the case of this particular patient (fig. 1). This patient's second operation was done one week after the first; and her final follow-up four years later was satisfactory, showing very little difference in the size of the breasts (fig. 2).

Postoperative treatment should consist of sufficient fluids, and blood as indicated. We always use fluids and, if necessary, blood during the operation to prevent shock and to have the patient come off the table in good condition. The postoperative dressing should be firm and in an uplifting direction; but, it should not be too constricting for natural respiration and circulation. This firm dressing tends to prevent hematoma from forming under the skin flaps, and will cause the draining of a small amount of oozing blood through the drain tubes inserted in the corners of the submammary incision.

The second operation, if contemplated, should be postponed until the incisions are entirely healed and all skin necrosing areas healed completely; by which time the patient should have regained good physical and mental health. This may require four months. At this time, a careful evaluation of the operation should be made and note registered of any irregularities of the scars, as well as any need to further reduce the size of the breast. In the second operation, the submammary scar can be placed in the submammary groove, and the irregular perpendicular scars straightened and adjusted. This second operation usually lowers the areola and nipple to a more satisfactory position.

Case Histories: Extreme hypertrophy in young women.

Here presented are histories of 2 cases of extreme hypertrophy in young women, reporting their physical and mental disabilities, and describing two operations for complete reconstruction. Other photographs, figs. 1, 2, 3, 4, show 2 other cases in older women in which we did one breast at a time, thus giving a fair comparison in reduction in the size of the breast and, at the same time, removing cystic areas. In neither of the cases involving the older women was further reduction required nor was correction of scars needed.

The Case of Miss L. S.

Miss L. S. was an 18 year old girl about to begin her first year at college. Her family were deeply concerned over her indifference toward going anywhere with the family or with friends. She wanted only to stay at home. Miss L. S. suffered chronic fatigue. Her stooped shoulders were quite noticeable. She was greatly disturbed that she had to buy tailored clothes and that it took so long to get them. She had long since desisted from taking part in

any normal physical exercise and she dreaded the thought that she might be forced to take gymnasium courses in college.

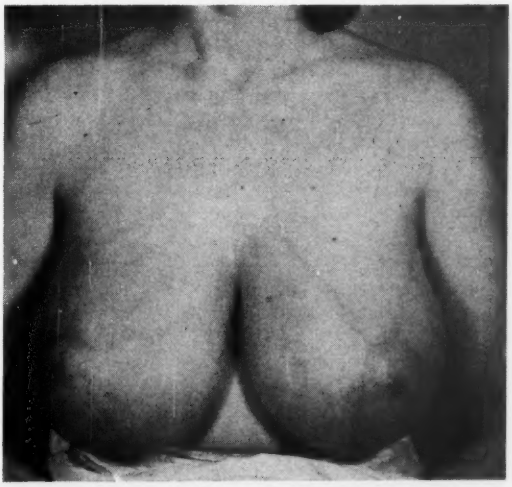


Fig. 5 L. S., age 18. Preoperative picture of patient showing symmetrical hypertrophy of breasts with marked venous congestion.

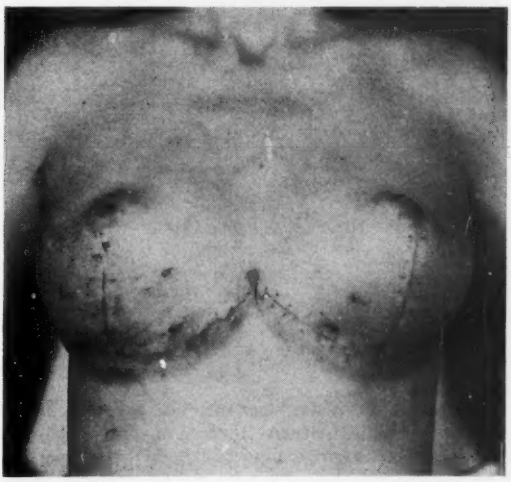


Fig. 6 L. S. Same patient as fig. 5, after removal of sutures.

All this—because of her painful pendulous breasts.

This case represents the glandular hypertrophy in the adolescent girl of otherwise normal build, and it is of probably endocrine origin.

The breasts were large, somewhat pendulous and painful, having areas of fibrocystic disease and considerable venous congestion. One could readily understand her physical and mental disturbance.

The technic followed here was primarily that of Gillies with the U pedicles removing most of the areas of cystic disease. Complete reduction was not thought possible at the first operation, so two stages were decided upon. Following the first stage, there was a small amount of slough of the margins of the skin flaps, and a small area around the left areola which cleared up well. During the next year, a second stage operation was done. This second stage operation removed the old perpendicular and submammary scars with the excision of a watermelon-shaped slice from the lower half of the breast; which, in turn, lowered the areola and nipple to a more satisfactory position.

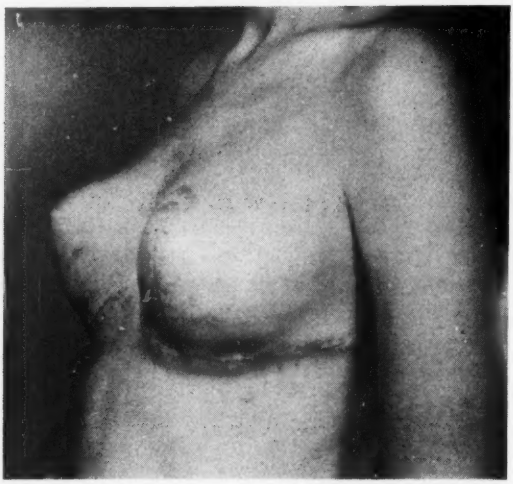


Fig. 7 L. S. Lateral view of fig. 6, immediately after removal of sutures.

There were no complications following this second procedure and, in approximately 10 days, all sutures were removed (figs. 5, 6, 7). Miss L. S. became active in sports, including riding and swimming. She, in fact, won the contest for having the best figure in her entire college before graduating from that college with honors.

The Case of Miss S. M.

The case of Miss S. M., white, aged 24, was operated Jan. 30, 1947. She had very large hypertrophied breasts that came down below the waist line. This condition started at the beginning of her menstrual periods at the age of 11 years. The breasts felt very heavy, at times very painful, and she had definite grooves on the shoulders caused by the brassiere straps. The same as the preceding case, she had to have her clothes tailored. During the war, she joined the WAC Service and during the regular drilling and marching, she had much pain, discomfort and heaviness in the breasts. This also is a case of glandular hypertrophy in a young woman with a probable endocrine background.

As shown in figure 8, there was much venous congestion of the glands and the right side was somewhat larger than the left.

Fig. 8 S. M. This picture represents the preoperative size of the breasts with marked venous congestion. Note: Breasts extend below umbilicus.

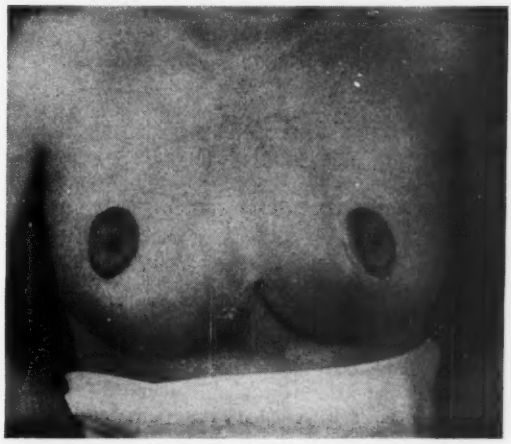


Fig. 9. S. M. Final result, anterior view of fig. 8.

The technic carried out in this case was a modification of that of Gillies and McIndoe of London, using the S-shaped pedicle to remove the outer portion of the breast, thus saving the main blood supply to the organ, the internal mammary. Two stages were performed on this patient because of the enormous size of the mammary glands. The second operation was performed five months after the first operation (figs. 9, 10).

In this method of mammoplasty, the new position of the nipples is deter-

mined by using a compass, but the patient's general configuration, size and body habitus must be taken into account. It must be kept in mind that the most common mistake is to get the nipples and breasts too close together. The internipple distance should rarely be less than nine inches and minor corrections can be made according to the judgment of the operating surgeon.

At the first stage, a small amount of infection occurred with a slight sloughing of mammary tissue. This was easily controlled and healed well.

At the second stage, the vertical scars were excised, a portion of the skin freed and a fair portion of breast tissue, wedge shaped, was removed from the lower half of the breast, thus obtaining a better form. The second operation is never extensive nor as time consuming as the first stage.

Fig. 10 S. M. Lateral view of fig. 8.

In a letter received from this patient's mother several months after the patient's discharge, I quote, ". . . we do want you to know how pleased we are with the results. Not only obvious improvement, which is almost a miracle, but my daughter is so much happier and much easier to live with. I am sure she did not realize how uncomfortable she was before."

I also want to mention, this patient was married 14 months after the operation to a physician and 11 months later gave birth to a normal baby. She suffered no ill effects on the mammary glands which did not lactate. If there should be some evidence of lactation or congestion, 5 mg. of Stilbesterol is given daily until the lactation period is over.

On recent examination the breasts have held well their shape and size. She is now a happy mother.

Summary

Two cases of mammoplasty are presented, one using a modification of the U-shaped technic and the other using a modification of the S-shaped technics of Gillies and McIndoe. The results in both cases left nothing to be desired as between the two methods—they

were essentially the same—giving relief for pain and correcting the underlying psychological difficulty. The general surgeon, with adequate background and an eye for artistic proportions, is well equipped to handle this problem.

REFERENCES

1. Cole, W. H., and Rositter, L. J.: Chronic Cystic Mastitis, with Particular Reference of Classification, Ann. Surg. *119:*573-590 (April) 1944.
2. Gillies, H., and McIndoe, A. H.: The Technique of Mammoplasty in Conditions of Hypertrophy of the Breast, Surg., Gynec. & Obst. *68:*658-665 (March) 1939.
3. Biesenberger, H.: Deformitaeten and Kosmetische Operationen der weiblichen Brust, Vienna: Wilhelm Maudrich, 1931.
4. Thorek, M.: Plastic Operations of the Breast in his Modern Surgical Technic, Philadelphia, *2*, pp. 1035-1041, J. B. Lippincott, 1938.
5. May, H.: Reconstruction of Breast Deformities, Surg., Gynec. & Obst. *77:*523-529 (Nov.) 1943.
6. Aufricht, G.: Mammoplasty for Pendulous Breasts: Empiric and Geometric Planning, Plast. & Reconstruct. Surg. *4:*13-29 (Jan.) 1949.
7. Bames, H. O.: Reduction of Massive Breast Hypertrophy, Plast. & Reconstruct. Surg. *3:*560-569 (Sept.) 1948.

PART II

CONSTRUCTION OF ARTIFICIAL VAGINA

It is not the intention of this report to evaluate in detail the different types of surgical procedures which have been described during recent years for the construction of an artificial vagina. This has been so ably done recently by Adams,[1] Owens,[2] Wharton,[3] Counseller[4] and others. The literature on this subject is voluminous. From this mass of information on the numerous methods and their individual modifications of these methods, one must conclude that the ideal procedure has not yet been found.

For the purpose of clarity, the various operative procedures may be grouped under seven headings, according to Marshall.[5]

1. Use of rectum (Popow-Schubert)
2. Use of ileum (Baldwin)
3. Tubal flaps (Frank-Geist)
4. Labial grafts (Graves)
5. Thiersch and thick split graft (Wharton, Adams, Owens, *et al*
6. Self-epithelization (Wharton, *et al*)
7. Simple mechanical invagination (Frank)

The Baldwin operation where a loop of ileum is used warrants further trial with the advent of antibiotics and in the light of present day improvements in surgical technic, together with preoperative and postoperative care of intestinal surgical cases.

Baldwin stated many years ago (Thorek Textbook, *3*): "The dangers of the Baldwin operation are simply those inherent in any other deliberate resection and anastomosis of the intestine."

It is my belief that there is a general acceptance that mucosal tissue is preferable in lining the newly created vaginal tract. Novak,[6] writing in an editorial on the "Congenital Anomalies of the Female Reproductive Organs," stated that—in his own experience— the Baldwin operation gave him a more nearly normal vagina than any obtainable by a simpler modern method. I agree with Novak, provided that the operator is thoroughly experienced in the handling of bowel surgery. Therefore, the Baldwin operation should particularly appeal to the general surgeon who has an extensive background of intestinal surgery and professional familiarity with the preoperative preparation and postoperative care of these patients.

Dubis,[7] of Cleveland, in discussing Counsellers's[7] paper in 1948, stated: "I personally favor the Schubert operation using the rectum, because a more normal organ is constructed." He further states: "Sometimes the simpler operation necessitates a more prolonged after-treatment," and reports 2 cases of the Schubert operation with good results and no mortality. He further states: "There is a mortality according to Schubert of 3.2 per cent in 95 cases. We must remember that these operations were originally done under adverse conditions. Today, with better technic, asepsis, antisepsis and transfusions, the morbidity and mortality rates should be reduced to a minimum."

The objections, heretofore, to the Baldwin operation have been "its great magnitude and high mortality" associated with it. If Schubert's mortality rate is correct, it would seem that the mortality rate using the small bowel would be less than that using the rectum. I have been unable to find any cases reported that have been done with the Baldwin method in recent years, that is, since the advent of antibiotics, improvements in surgical technic and the recent concept of surgical physiology manifested in preoperative and postoperative care.

The newer technics of so-called simpler methods in comparison to the Baldwin operation appears relatively safe in so far as mortality goes. Adams[1] states: "They possess other features which leave much to be desired." Counseller[4] also stated in 1939: "The mortality following the use of pedicle and free grafts is small but the percentage of failure to obtain a satisfactory organ for coitus is extremely high." However, in 1948, Counseller[7] reports good results using Thiersch graft and self-epithelization with a mold, but states "I have the greatest difficulty in convincing patients and some

Fig. 1. Preoperative view showing dimple where vagina should be present.

Fig. 2. View showing dissection of labial flaps to be used for construction of new vagina.

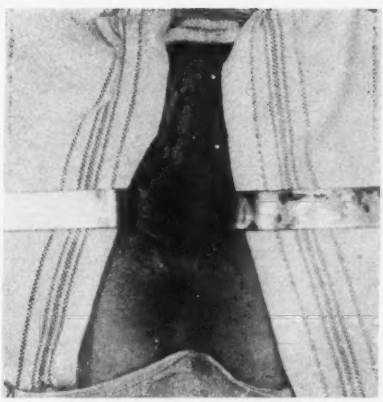


Fig. 3. Immediate end result (Graves Technic).

physicians that the mold must remain in position for at least six months or longer, and that it must be removed only for cleansing purposes or for inspection of the grafts." Not only are the simpler procedures unsatisfactory and inadequate in many cases to insure a stable vaginal lining, but—this is even more serious—one can seldom count on the prolonged cooperation of the patients, so essential to the carrying out of these procedures, since they all require the wearing of some type of stint or mold for six months or longer.

Moreover, in the case of tubular grafts or thick skin grafts, there

is the additional problem of the continuous contraction tendency, plus the difficulty arising from hair growing in the vaginal canal, with sebaceous secretions and maceration, a most uninviting condition to both female and male. This situation in turn causes infrequent use of the vaginal canal, giving rise to further contracture and, in some instances, causing divorce. The end result of these added inhumanities will be a female, already psychologically handicapped, but now further depressed, frustrated, and with a hopeless outlook on life. The same might be said of self-epithelization, as well as Thiersch grafts, where the canal is very unstable and intercourse becomes painful and detestable.

The most desirable operative procedure is obviously the one that is relatively safe in experienced hands, and which gives the patient a pliable, stable vaginal lining, satisfactorily lined with mucus membrane, surrounded by normal connective and muscular tissue, with an ample blood supply. The Baldwin operation would, therefore, seem to meet all requirements.

In cases requiring reoperation due to failure by some of the simpler methods, the Baldwin method certainly seems, to the author, the operation of choice because the cicatricial tissue encountered in such instances does not lend itself well to skin grafts or any other simpler methods of reconstruction. I saw a case recently that had been a failure in two previous attempts, one by self-epithelization and one by skin transplants. The patient had also had an abdominal exploration by a surgeon who had found horseshoe kidney lying over the brim of the pelvis, normal ovarian tissue, but a congenital absence of a normal uterus. The patient is to return later for the Baldwin type of operation.

My first case of construction of artificial vagina took place in 1935. This case was operated according to the technic of Graves, with labial transplants, and by use of a rubber stint (figs. 1, 2, 3). This operation, as well as other skin transplant methods, showed apparent favorable results when the patient left the operating table. Both the patient and I, at first, considered the operation a success, and the patient married in about six months. However, some time after the patient's marriage, the unfortunate complications which attend these methods did set in. There was cicatricial contraction. Hair grew in the dome of the vagina and maceration ensued. The patient was divorced and, consequently from disuse, the vagina shortened from 4½ inches to 2 inches.

Although I have had no experience with the Adams[1] technic of construction of artificial vagina, where he employs intermediate thickness grafts over wire mesh mold covered with rubber, later

to be replaced by an acrolite hard mold; this to be replaced later by a third mold, consisting of rubber sponge covered by a condom and worn until all danger of contracture of the skin grafts is passed, or Owens[2] technic using half thickness grafts over pyrex glass forms, these types of operation seem to promise a more stable and pliable vaginal lining, with less contraction than any other of the simpler modern methods. They certainly should be considered by those not wishing to employ the Baldwin technic.

In applying surgical procedure to create a new vagina, several conditions should be met before any operative intervention ought to be considered. The patient should possess secondary sex characteristics which would indicate sufficient amount of ovarian tissue; and the sex impulse should be sufficiently developed so as to cause a desire for marriage. The patient should also be of female figure and pseudohermaphroditism should be ruled out. Additional study of the case in the light of selectivity should bring out information on other congenital abnormalities, particularly of the urinary tract, since these patients frequently have associated anomalies.

The Case of Miss C. B. (Baldwin Technic)

This case seemed to meet all requirements before operative procedures were considered.

Fig. 4. Postoperative picture after using the Baldwin Technic.

Miss C. B. had no detectable urinary anomalies, the genital organs were well developed. On rectal examination, no vaginal tract could be palpated, nor could a uterus or cervix be felt. A mass in the region of the left ovary was palpable and tender. It was believed to be the left ovary. The type

of operation I proposed doing was fully explained to her and she readily accepted it as she "didn't care to remain with the present physical and mental condition," and furthermore, she "hoped to be married in the near future." For five days before operation she received a course of sulfasuxadine and the usual preparation for intestinal resection. It is advisable to pass a Miller-Abbott tube the day before operation in order that it might be well down in the small bowel at the time of operation for decompression purposes.

Fig. 5. Postoperative, showing 5-inch No. 4 metal rectal dilator in newly made vagina. Dilator was passed for purpose of showing depth of vagina with this type of operation, as patients are not required to wear molds.

The operation itself followed a well defined pattern. Transverse incision was made in the mucous membrane across the dimple between the external urethra and anus in the body of the perineum, followed by blunt dissection. The bladder and rectum were dissected apart for a depth of about 6 inches. No trouble was encountered and no bleeding of any importance. A sponge forcep was then placed in the wound and the wound packed with gauze. The abdomen was then opened, and on inspection, there appeared a normal ovary on each side; also small rudimentary uteri with one tube on each side. There was no evidence of previous menstruating of these uteri. A cervix, if present, was not discernable.

A loop of small bowel about 12 inches long and about 8 inches from the ileocecal valve was resected, leaving its mesentery intact. The continuity of the intestinal tract was restored by an end-to-end anastomosis, using the Parker-Kerr basting stitch technic. (With proper preparation, the surgeon may choose his favorite type of anastomosis.) The blind ends of the loop were closed with basting stitch of chromic catgut No. 0, reversing itself and being tied at the beginning. The peritoneum between the bladder and the rectum was then opened on the forcep which had been left in from below. The peritoneal opening was enlarged to about 2 inches, and the loop of bowel with

its mesentery attached was pulled through by an assistant using the aforementioned forcep, the mesentery going to the right and the loop of bowel to the center and left. The peritoneum was tacked over the blind ends of the bowel, but not to the mesentery. The abdomen was closed in layers, without drainage, after using 5 Gm. of sulfanilamide in the pelvis. (Note: Streptomycin, today, is the better choice.) Miss C. B. was then put back in lithotomy position, the apex of the loop was sutured to the mucus membrane of the vulva, opened, and the limbs of the loop aspirated and packed lightly with gauze packing. A retention catheter was left in the bladder to be connected to a bottle at the bedside.

The packing was gradually removed from the loop of small intestine, beginning the second day after operation and continuing until it was completely out in five days. At this time, warm saline irrigations were instituted. There was no infection, and healing by prima of both the abdominal wound and the wound of the vulva began.

Four months later, the patient was again taken back to the hospital, given a light anesthesia, and a bivalve speculum was placed in the new vagina. One valve of the speculum was placed in one arm of the bowel, and the other valve placed in the opposite arm of the bowel. Two 4 inch crushing clamps were placed side by side on the septum, and this was severed with a knife for a distance of approximately 5 inches. The new vagina was packed with 2 inch vaginal packing, thus keeping the clamps in their relative position. The crushing clamps were left on for 24 hours. It is believed that this technic is better and quicker than that of putting on a crushing clamp and leaving it on for five days, to slough out (figs. 4, 5).

The postoperative care of patients, such as Miss C. B., immediately following the major operation, is that which is observed in any well planned bowel resection. The patients should receive fluids and blood while the operation is being performed, as well as I. V. feedings for the following three to five days, while small amounts of fluids are allowed by mouth, and continuous suction is applied to the Miller-Abbott tube. From the third day on, the tube is clamped at intervals and diet is given by mouth. After the agglutination of the stoma is firm and functioning with no distress or distention on clamping the tube, it may be removed and the patient fed entirely by mouth.

Conclusion

With the advent of antibiotics, the development of our concept of surgical physiology and in the light of present day improvements in technic, together with the preoperative and postoperative care of intestinal surgical cases, the Baldwin operation warrants further trial only by those qualified in intestinal surgery. It is believed by using this technic that a better vagina is created, one giving a pliable stable lining, satisfactorily lined with mucous membrane, surrounded by normal connective and muscular tissue with ample blood supply. The opinion is expressed in cases requiring reoperation due to fail-

ure of some of the simpler methods that the Baldwin technic seems to be the operation of choice, because the cicatricial tissue encountered in such instances does not lend itself well to skin graft or self-epithelization.

Two cases are presented, one using labial transplants and rubber stints which accentuated the postoperative problem in subsequent difficulty on the part of the patient with skin contraction and shortening of the new vaginal tract. Although the results reported by the patient were satisfactory, further investigation later on proved otherwise. The second case using the Baldwin type of operation was with good results and a happy married sexual life.

REFERENCES

1. Adams, W. M.: Construction of Artificial Vagina, Surg., Gynec. & Obst. *76:*746-751 (June) 1943.
2. Owens, N.: Simplified Method for Formation of an Artificial Vagina by Split Skin Graft; Report of case, Surgery *12:*139-150 (July) 1942.
   A Suggested Pyrex Form of Support of Skin Grafts in the Construction of an Artificial Vagina, Plast. and Reconstruct. Surg. *1:*350-359 (Nov.) 1946.
3. Wharton, L. R.: A Simple Method of Constructing a Vagina; Report of Four Cases, Ann. Surg. *107:*842-854 (May) 1938.
   Further Experience in Construction of the Vagina; Report of Twelve Cases, Ann. Surg. *111:*1010-1020 (June) 1940.
   Difficulties and Accidents Encountered in Construction of the Vagina, Am. J. Obst. and Gyn. *51:*866-875 (June) 1946.
4. Counseller, V. S.: New Surgical Treatment for Congenital Absence and Traumatic Obliteration of the Vagina, S. Clin. N. A. *19:*1047-1052 (Aug.) 1939.
5. Marshall, H. K.: Formation of an Artificial Vagina; Experience with three different Corrective Procedures, West. J. Surg. *52:*245-255 (June) 1944.
6. Novak, E.: Congenital Anomalies of the Female Reproductive Organs, Surg., Gynec. & Obst. *86:*249-252 (Feb.) 1948.
7. Counseller, V. S.: Congenital Absence of the Vagina, J.A.M.A. *136:*861-866 (March 27) 1948.
7. Dubis, J. L.: Abstract of Discussion, J.A.M.A. *136:*866 (March 27) 1948.

The Southern Surgeon

Published Monthly by

The SOUTHERN SURGEON PUBLISHING COMPANY

701 Hurt Building

ATLANTA 3

IRVIN ABELL, JR., M.D.
Editor

B. T. BEASLEY, M.D.
Managing Editor

CHAS. R. ROUNTREE, M.D.
Associate Editor

J. DUFFY HANCOCK, M.D.
Associate Editor

H. EARLE CONWELL, M.D.
Associate Editor

A. H. LETTON, M.D.
Book Review Editor

R. H. STEPHENSON, M.D.
Abstract Editor

Subscription in the United States, $8.00

Volume XVI | December, 1950 | Number 12

A RECEPTIVE AND ANALYTIC MIND: AN ESSENTIAL TO SURGICAL PROGRESS

The history of surgery is one of which we are all very proud. From what we now consider to be crude beginnings has evolved a vast and ever expanding interrelated group of subdivisions of surgery. Because of the number and intricacies of these various arts and sciences, the limitations of time dictate that we must choose between knowing less and less about more and more and knowing more and more about less and less. Thus we find, with good individual reasoning, that the majority of surgeons, after broad education and wide experience, select only certain fields of surgery with which to occupy most of their time.

This concentration of thought and effort accounts in large measure for the increasing degree of progress that has taken place, particularly within the last quarter century. Surgical ideas, conceived but unaccomplished previously, have materialized; small-scale and partial accomplishments have been refined and have expanded into safe usage for the benefit of the many, rather than for the few.

A surgical idea is born and another is reactivated in the light of present knowledge. The individual or individuals to whom it comes

consider it from many standpoints: namely, its soundness, physiological concepts, mechanical accomplishment and its limitations as to achievement of the goal, as related to cure or alleviation of a given disease process. The idea must be intelligently thought through, and unknown and incomplete but related factors must be studied. All this requires time and persistent effort.

An idea may be born at the moment an unexpected and complicated problem is met; it may thrust itself forward at any odd moment of discussion, recreation or rest. A potentially constructive idea may be tucked away in a remote corner of the mind, forgotten or neglected, only to assert itself when someone else gives birth to, and begins to rear, an offspring of similar appearance. This sometimes produces strange reactions relative to priority and possession.

The parent or foster parent of such an idea should be conservatively enthusiastic, as well as constructively critical, realizing that panaceas are nonexistent but that each constructive thesis, properly guided, may have a valuable place in the equipment we use to preserve health. Surgeons should watch with patience and interest the development of these brain children; they too should be constructively critical and particularly should they be prepared to sponsor an idea when eventual maturity gives promise of assistance in their selected branch of endeavor.

A receptive and analytic mind is essential for the conception of ideas. When the mill of time has separated the wheat from the chaff those surgeons with receptive and analytic minds will evaluate and adopt the appropriate kernels. Surgical progress is dependent upon these processes.

CHARLES W. MAYO, M.D.

BOOK REVIEWS

The Editors of THE SOUTHERN SURGEON *will at all times welcome new books in the field of surgery and will acknowledge their receipt in these pages. The Editors do not, however, agree to review all books that have been submitted without solicitation.*

BONE AND JOINT DISEASES. By J. VERNON LUCK, M.S. (Ortho.), M.D., F.A.C.S., F.I.C.S., Asst. Clinical Prof., Univ. of Southern California, 1950. Springfield, Ill.: Charles C Thomas, Publisher. 614 pages. $16.50.

This book, which the author claims has been in preparation for ten years, beginning as a set of mimeographed lectures, covers very well the field of bone and joint diseases. The author realized the confusion in this field and also realizes the urgent need for further correlation of the reflections of the disease and the pathological anatomy, and clinical symptoms. Interest apparently has been based upon the dynamic quality of pathological events and upon the fact that the disease is not a thing but a process. The contents of the book seem to leave little to be desired. They begin with a very good chapter on the normal skeletal system, then gradually work through the infected processes, aseptic osseous necrosis, fractures, arthritis, metabolic conditions, etc., down through the various tumors, as well as the other peculiar diseases of the bone and joint.

The binding is good. The paper is excellent. The photographs and drawings are quite good.

Very little is said throughout the book on the treatment of the various diseases. There is no explanation of operative procedures, nor are any outlined. The chapter on fracture healing is very good.

This is an excellent volume for the general surgeon, the hospital library, as well as the orthopedic specialist and the roentgenologist. The latter two would probably like a volume in which a little more specific detail has been included.

A. H. LETTON, M.D.

AN ATLAS OF HUMAN ANATOMY. By BARRY J. ANSON, Ph.D., Professor of Anatomy, Northwestern University, Medical School. Philadelphia: W. D. Saunders Co., 1950. 518 pages. $11.50.

"An Atlas of Human Anatomy" has been prepared by the author to contain a series of pictures based upon many dissections, serially prepared, and upon variable morphological features statistically presented. It was prepared with the thought that it would be of service to students in medicine and practitioners, with whom illustrations must serve in substitution for the actual specimens. The drawings were prepared by artists and were not warped to conform to a preconceived stereotyped concept of human morphology, nor simplified to serve as transitory chartings for a laboratory excursion. The contents of the volume have been limited to those features of human structure which are demonstrable in regular study of the cadaver.

The drawings are for the most part pen and ink etchings, although there are a few which are smudged and a few are in color. The dissections have been done in such a way that the third dimension can be understood easily and are all considered excellent. In those structures which have a normal variation there are diagrams showing these variations, as well as statistical figures beside

each. There is very little written word in the volume, with an occasional paragraph to explain the dissection. This is a very excellent atlas of human anatomy, and should be continuously useful to the reader from his days as a novitiate through those days in which his responsibilities as a doctor require a reference book based not upon copied figures but upon the artistic and unbiased portrayal of dissection. This volume should be standard in all operating rooms, as well as in the libraries of all hospitals. The medical student will find it useful, as will the specialist and surgeon.

A. H. LETTON, M.D.

ABSTRACTS FROM CURRENT LITERATURE

THE GRAVE SPINAL CORD PARALYSES CAUSED BY SPINAL ANESTHESIA. Foster Kennedy, Abraham S. Effron, and Gerald Perry. *Surgery, Gynecology and Obstetrics 91*:385-398 (Oct.) 1950.

In this communication from the Neurological Service of Bellevue Hospital, Kennedy continues his crusade against spinal anesthesia. Following an exhaustive review of the literature on the subject, the authors present 12 new cases of neurological disturbance following spinal anesthesia. Detailed reports of the technics employed are not given but the dosages and concentrations of the drugs used are stated when known. The disabilities in these 12 cases varied from paresthesias, trophic ulceration, impotence, etc., to complete paraplegia. In certain instances, laminectomy was performed and the operative findings are described.

The authors do not question the advantages claimed for spinal anesthesia but they feel that the gravity of the many possible complications is underestimated as is the probability of their permanence. The summary is quoted:

"In summary, we have attempted to review the literature of this subject. We have reported 12 cases of grave paralyses following the use of spinal anesthesia; these in addition to 3 other cases published by one of us in 1945. It is to be noticed that throughout the literature there is huge variation in the figures given of complicating nervous system symptoms. An explanation for such lack of uniformity in figures may very well be found in the fact that often and in the majority of our cases spinal cord symptoms appeared some considerable time after the patient had been discharged from surgical care, so that the surgeon and anesthetist and, indeed, occasionally the patient was unaware of the relationship of the progressive paralysis of the legs to the previous spinal anesthetic.

"So, spinal anesthesia is accompanied by many definite and terrible dangers which are far too little appreciated by surgeons and anesthetists.

"From a neurological point of view, we give the opinion that spinal anesthesia should be rigidly reserved for those patients unable to accept a local or general anesthetic.

"Paralysis below the waist line is too large a price for a patient to pay in order that the surgeon should have a fine relaxed field of operation."

R. H. S.

THE CLINICAL PHYSIOLOGY OF THE HUMAN BRONCHI. I. Pain of Tracheobronchial Origin. Douglas R. Morton, Karl P. Klassen, George M. Curtis. Surgery *28*:699-704 (Oct.) 1950.

In a review of the literature pertaining to the afferent innervation of the lungs and respiratory tree, the authors found that the concept of the existence and localization of tracheobronchial pain in the human being is poorly understood. In a simple and direct attack upon the problem, electrical stimulation of the mucosa of the bronchi and trachea was carried out in specially selected patients undergoing diagnostic bronchoscopy. A specially designed, ball pointed, single electrode, using the bronchoscope as part of the circuit, proved to be most satisfactory. In each patient, the posterior wall of each of the main bronchi and the trachea were stimulated. The patient indicated the localiza-

tion of the resulting pain and the results were plotted on a composite diagram. It was found that, in general, pain arising from the bronchial tree is referred to the homolateral anterior chest within 2 to 4 centimeters of the sternum, or to the anterior cervical region within 2 centimeters of the midline. Pain of tracheal origin is felt in the midline anteriorly at sites extending from the larynx to the xiphoid process.

Morton and his co-workers are making further studies in an attempt to establish the afferent nervous pathways which transmit the sensation of tracheobronchial pain to the central nervous system.

R. H. S.

THE SOLITARY GALLSTONE. Robert S. Mechling and James R. Watson. Surgery, Gynecology and Obstetrics *91*:404-408 (Oct.) 1950.

"Solitary gallstones are often interpreted as harmless occupants of the gallbladder, and when found during the course of routine health examinations are apt to be dismissed as unimportant findings if they are not producing symptoms. The purpose of this paper is to demonstrate that the solitary stone produces the same signs and symptoms as those caused by multiple stones, that it causes the same complications, and that these occur with sufficient frequency to make its presence, even when asymptomatic, a positive indication for cholecystectomy."

In a series of 387 cases reviewed for this study, solitary stones were found in 82 or 21 per cent. They varied in size from 0.7 to 7.0 cm. A comparison of the frequency of the various signs and symptoms produced by solitary and multiple stones revealed little significant information. Solitary stone occurred slightly more frequently in the male than in the female.

Complications of gallstone occurred in 41.47 per cent of the patients with solitary stones as compared with 29.84 per cent of the patients with multiple stones. This probably accounted for the higher mortality rate (3.65 per cent) in the group with solitary stone as compared with those with multiple stones (1.63 per cent).

Though a cholecystographic report of the presence of gallstones is highly reliable, any report as to the number present is unreliable.

The authors conclude that there is no logical reason for regarding solitary gallstones as any different from multiple gallstones. "Gallstones are gallstones whether single or multiple, large or small; their behavior is the same and their treatment should likewise be the same."

R. H. S.

MALIGNANT BLOOD VESSEL TUMORS. A Report of 56 Cases of Angiosarcoma and Kaposi's Sarcoma. William D. McCarthy and George T. Pack. Surgery, Gynecology and Obstetrics *91*:465-482 (Oct.) 1950.

Prompted by a recognition of the confusion that exists in the literature regarding malignant tumors of blood vessel origin, the authors have attempted to clarify the situation. In this study, all the cases of angiosarcoma of all types seen at Memorial Hospital (New York) over a 10 year period were collected and are here analyzed. Included in this series are 36 cases of Kaposi's sarcoma which the authors consider to be a true hemangioma. Utilizing this group of

cases a nucleus for a discussion of recent developments in the etiology, pathology, experimental tumor production, diagnosis and therapy of such tumors, the authors have drawn supplementary information from a previous review of benign blood vessel tumors seen at this hospital.

Several new conclusions are developed. It was noted that Kaposi's sarcoma exhibited definite predilections in race, sex, and anatomical location of the initial lesions. Eighty-two per cent of the patients were either Jewish or Italian, 92 per cent occurred in males and 87 per cent originated in the extremities. When it does occur in females, the disease is bizarre and fulminating. Similar predilections are noted in the cases of angiosarcoma. A systemic factor, perhaps hormonal, would seem to be involved in the development of malignant vascular tumors. Trauma appeared to be directly involved in the development of angiosarcoma in 3 patients and was suspected in 2 other cases of angiosarcoma of the breast. Angiosarcoma was observed to develop from benign angiomas in 3 patients. These tumors had been previously treated with irradiation. Recent reports have described a new entity in which Kaposi's sarcoma originates in postmastectomy lymphadematous arms. The writers add 2 such cases.

Radiation therapy of Kaposi's sarcoma is evaluated. It is indispensable in palliation. The authors advocate accurate irradiation of individual lesions and condemn blanket irradiation. A new approach to the treatment of early lesions featuring radical surgery is presented.

X-ray and radium treatment has a definite place in the curative treatment of angiosarcoma of the nasal cavity and paranasal sinuses. X-radiation is indispensable in palliative treatment of advanced lesions.

The authors are able to report the following figures: *Angiosarcoma*—Average survival interval, two and one-half years; three year cure rate, 17 per cent; five year cure rate, 9 per cent. *Kaposi's sarcoma*—Average survival interval, eight years (several patients alive 10 to 25 years following onset); five year cure rate, 19 per cent.

Prompt amputation is deduced to be the only curative therapy for angiosarcoma of the extremities.

The writers urge that the term "hemangioendothelioma" as used to describe a benign angioma in children be dropped from use since the term implies malignancy and needless sacrifice of limbs may result from its misinterpretation.

R. H. S.

OPERATIVE REPAIR OF SLIDING INGUINAL HERNIA. Gordon K. Smith. Western Journal of Surgery, Obstetrics, and Gynecology *58*:318-320 (Oct.) 1950.

Recognizing sliding indirect inguinal hernia as a distinct entity and realizing that the usual inguinal repair as applied to this lesion fails to satisfy the cardinal principle of high ligation of the sac, the author describes a combined abdominoinguinal approach. In essence, the procedure consists of a cecopexy or sigmoidopexy utilizing the redundant portion of the sac to invest the caudal portion of the bowel with peritoneum and fix it to the parietal peritoneum. The procedure avoids injury to the mesocolon and does not twist or rotate the colon sufficiently to produce any degree of obstruction. The author feels that the technical ease with which this procedure can be carried out recommends it for trial by those unfamiliar with the technic. He states that it is performed

with somewhat greater ease on the left than on the right. Lucid illustrative drawings are included.

R. H. S.

PREVENTION OF SOME POSTGASTRECTOMY DIFFICULTIES BY NEW GASTRECTOMY TECHNIC (Pantaloon Anastomosis). M. E. Steinberg. The Journal of the International College of Surgeons *14*:194-204 (Aug.) 1950.

The author shares Schindler's belief that a great deal of the unpleasant symptoms following gastrectomy are based on a gastritis due to unregulated reflux of intestinal juices into the stomach. In an effort to prevent this reflux, Steinberg now employs a pantaloon type of anastomosis which he first conceived and reported in 1933. He did not employ the procedure in the treatment of duodenal ulcer until 1943 and it was not until 1946 that he realized its full possibilities. Since that time he has used the method in 86 cases.

Technically, the method consists of forming a jejunal pouch by continuous enteroenterostomy in a reduplicated loop of jejunum. The pouch is closed except at the angle of the loop where it is anastomosed to the gastric stump or to the esophagus as the case may be. The technic is illustrated with detailed drawings.

The writer gained the impression that patients so treated complained of transient, mild symptoms such as intolerance to milk and sweets just as frequently as did those who were treated by the conventional Hofmeister-Finsterer technic but that the more severe symptoms associated with the "dumping syndrome," anorexia, nausea, etc., did not occur. The summary is quoted in part: ". . . There were no deaths in the 86 consecutive gastrectomies by the pantaloon procedure. . . . The . . . operation abolishes and ameliorates certain intractible disabilities and annoying symptoms not infrequently encountered after gastrectomy performed by the established methods.

"Five patients who were reoperated upon by the pantaloon method because of severe manifestations of the postgastrectomy syndrome which followed the conventional method of anastomosis were relieved of the annoying symptoms. All gained weight.

"The pantaloon gastrectomy has particular advantages and safety factors in operation for carcinoma of the stomach and for gastric ulcer situated near the cardia in the presence of a minimal gastric remnant. A wide area of gastrojejunal approximation is permissible without endangering free passage.

"This operation is recommended for total gastrectomy because it is safer than the established method. It also prevents regurgitation of irritating intestinal contents into the esophagus. It creates a large storage space as a 'substitute stomach.'

"The pantaloon method of gastrectomy is superior to the established procedure and is now employed for all patients requiring gastrectomy for ulcer or cancer."

R. H. S.

HUMPHREY DAVY'S CONTRIBUTION TO ANESTHESIA. F. F. Cartwright. Proceedings of the Royal Society of Medicine *43*:571-578 (July) 1950.

In offering this essay in celebration of the one hundred and fiftieth anniversary of Davy's publication of his researches upon nitrous oxide, Cartwright

purports to trace the chain of events connecting Davy with the introduction of anesthesia. In a brief biographical review, evidence is offered in contradiction to some existing ideas concerning Davy's life and work. For example, Davy's own words: ". . . in March, 1798, my attention was drawn to the dephlogisticated nitrous gas of Priestly . . ." would seem to disprove the oft-repeated story which places the beginning of his experiments with the gas around 1794 or 1795. The author denies that Davy invented the method of producing nitrous oxide that is usually credited to him (by heating ammonium nitrate) but states that the method was first described by the French chemist, Berthollet.

Davy's original experimentation with the inhalation of the gas was undertaken to disprove Mitchell's principle of contagion which was popularly accepted at that time. Following observations of the effects on animals of respiration of various concentrations of the gas, Davy turned to experimentation with human beings. Probably no scientist has ever utilized such an illustrious group of volunteers. The poets Southey, Coleridge and Wordsworth, James Watt the engineer, Tobin the playwright, the Wedgewoods, the Edgeworths and Joseph, the son of the great Priestley, all inhaled the gas and most of these have left descriptions, in their own words, of the sensations experienced.

From April until the end of July in 1799, Davy inhaled nitrous oxide daily. His health deteriorated rapidly but he has stated that his decline was due to certain "moral" causes. He did, however, credit a certain irritability and hypersensitivity of the perceptive senses to the inhalation of the gas. It is notable that he became addicted to its use but must have experienced little difficulty in breaking the habit since he did not inhale the gas after moving to London in 1800 except for rare demonstrations.

The author has noted a number of entries in a rough notebook used by Davy during the preparation of his paper. Certain discrepancies between this notebook and the published work are discussed at some length.

Some time in the spring of 1800, Davy scribbled "removing physical pain of operations" between the lines of an essay he was writing. At the end of *Researches,* he listed several possible uses to which nitrous oxide might be put. Among these suggestions occur the following words which, Cartwright feels, establish Davy's discovery of anesthesia: "As nitrous oxide in its extensive operation appears capable of destroying physical pain, it may probably be used with advantage during surgical operations in which no great effusion of blood takes place."

The author concludes: "Humphrey Davy, first of all men, discovered the anesthetic action of nitrous oxide; Humphrey Davy, first of all men, suggested a practicable means of allaying the agony of surgery. Humphrey Davy discovered anesthesia."

R. H. S.

POSTOPERATIVE SALT RETENTION AND ITS RELATION TO INCREASED ADRENAL CORTICAL FUNCTION. Henry T. Johnson, Jerome W. Conn, Vivian Iob and Frederick A. Coller. Annals of Surgery *132*:374-385 (Sept.) 1950.

Disturbances in the electrolyte balance and protein metabolism immediately following surgery have long been recognized. Moyer has previously shown that the electrolyte disturbances cannot be attributed to decreased renal blood flow, water deficit, sodium or chloride lack, or to the action of the anesthetic

agent. It has been demonstrated further that the negative nitrogen balance encountered is independent of protein intake. It is known that following a major surgical procedure a sharp increase in adrenocortical function occurs. The sharp rise in urinary excretory products of the 11-oxysteroids reflect the rise in these particular secretions. Since an increase in the 11-oxysteroids produce a depression in the number of circulating eosinophiles, the fall in the number of these cells provides an accurate and simple index of increased elaboration of these secretions. Another action of the 11-oxysteroids is catabolism of body protein.

With these facts in mind, the authors reasoned that increased production of desoxycorticosterone-like steroids might also be expected to occur. Lacking a method of direct measurement of the changes in the endogenous production of these electrolyte regulating steroids, the workers have used the method developed by one of them (Conn) who has demonstrated that the electrolyte composition of thermal sweat offers a reliable index of changes in the activity of these steroids.

Twelve men and two women patients were studied by multiple sweat tests and eosinophile counts before and after operation. These subjects were of a wide age range. The surgical procedures carried out ranged from vein ligation to gastric resection. All were excellent surgical risks and in good nutritional state. Most of them received 5 Gm. of sodium chloride daily either by mouth or parenterally during the postoperative period. The results of these determinations are clearly presented in line graph figures. These data supplement previous knowledge on the subject in demonstrating the participation of increased activity of electrolyte-regulating steroids in the immediate postoperative period. Since the entire metabolic picture exhibited by the postoperative patient can be duplicated in healthy individuals by injections of ACTH, it is now evident that a major surgical procedure constitutes an "alarming stimulus" in man.

The authors conclude that increased elaboration by the adrenals of desoxycorticosterone-like steroids accounts, at least in part, for salt retention and the accompanying potassium diuresis after operation.

R. H. S.

NONGONORRHEAL VULVOVAGINITIS DUE TO GRAM-NEGATIVE INTRACELLULAR DIPLOCOCCI. Jon Dale Weaver. American Journal of Obstetrics and Gynecology *60*:257-260 (Aug.) 1950.

In a routine gynecological study of 1,014 children at the Austin (Texas) State School, inflammatory change of the genital tract was observed in 25.8 per cent. Of these, 12 had a vulvovaginitis from which gram-negative diplococci were cultured. The gross appearance of the tissues as well as the microscopic appearance of the stained smears were identical with those of gonorrhea. Only by differential fermentation tests was the true nature of the organism (*Neisseria sicca*) determined. The authors conclude that vulvovaginitis due to gram-negative intra- and extra-cellular diplococci is not necessarily gonorrhea and urge routine culture in such cases to prevent erroneous false diagnosis.

R. H. S.

DIVISION OF POPLITEAL VEIN IN THE TREATMENT OF SO-CALLED VARICOSE ULCERATION. Gunnar Bauer. British Medical Journal, 319-321 (Aug. 5) 1950.

At the General Hospital in Mariestad, Sweden, Bauer has performed division and ligation of the popliteal vein in 245 cases of indolent leg ulcer and reports follow-up observation on 196 of these. His reasoning in electing this procedure seems to hinge on his conviction that varicosities of the superficial system have little or no part in the causation of stasis ulcers and that they are due to a chronic edema secondary to valvular incompetence of the deep system. He reasons that by interruption of the popliteal vein, the blood is then forced into the thigh from the leg by muscular action through channels which are too small to be incompetent.

"After this operation the calf muscle contractions drive the blood through numerous fine-calibered channels into the muscle veins of the thigh, and no back flow can occur." Be this as it may but, in any event, he is able to report that of 196 cases followed from 6 months to 3 years, 165 (84 per cent) remained healed and without stasis symptoms. In the remaining 16 per cent, intervals with recurring symptoms were observed.

R. H. S.

INDEX TO VOLUME XVI

Abstracts from Current Literature, Book Reviews and Editorials are grouped together and are indexed under that heading in alphabetical order.

A

Abell, Irvin, Jr.: Late Symptoms of Carcinoma of the Pancreas, 168
Abdominal Aortography, Alvin B. Ortner, 157
Abscess, lung: See Harter
Abscess, psoas, tuberculous: See Hoover
Abstracts from Current Literature:
Abdominal Complete Hysterectomy, Wm. C. Curtis, et al, 927
Abolition of Pyloric Spasm by Orally Administered Procaine Solutions, G. Roka and L. G. Lajtha, 922
Acute Pancreatitis, Vinton E. Siler and John H. Wuslin, 619
Advantages of Light Lateral Decubitus in Cholecystography, B. R. Kirlin, 521
Ainhum (Dactylolysis Spontanea), D. C. Hucherson, 1030
Anatomy of the Hernial Regions, II. Femoral Hernia, B. J. Anson, et al, 325
Anatomy of the Hernial Regions, III. Obturator Hernia and General Considerations, B. J. Anson, et al, 426
Aneurysm of the Splenic Artery, B. Sherwin and H. Gordimer, 724
Anticoagulant Therapy in Surgery, Geza de Takats, 624
Anuria and the Surgeon, A. M. Joekes, 1030
Attempt to Evaluate the Radical and Palliative Treatment of Breast Carcinoma, Thomas G. Orr, 722
Cancer of the Rectum, D. B. Pfeiffer and D. B. Miller, 1133
Cause of Death in Strangulation Obstruction, P. Nemir, et al, 45
Choledochostomy—Advantages of a Modified T Tube, R. R. Best, 723
Chronic Intussusception in Infancy, Harry Medovy, 919
Circulation of the Small Intestine: An Evaluation of its Revascularizing Potential, R. J. Noer, et al, 49
Clinical Physiology of the Human Bronchi, D. R. Morton, 1221
Clinical Use of Polythylene Tubing for Intravenous Therapy, 46
Complete Abdominal Hysterectomy. A Simplified Technique and End Results in 500 Cases, A. H. Alredge and R. S. Meredith, 720
Congenital Aneurysm of Superior Vena Cava, Osler A. Abbott, 623
Congenital Pyloric Stenosis in Binovular Twins, E. S. R. Hughes, et al, 47
Congestive Atelectasis—A Complication of the Intravenous Infusion of Fluids, M. T. Jenkins, et al, 1130
Contribution to the Surgical Significance of Aberrant Hepatic Ducts, V. Rapant and J. Hromada, 1034
Critical Evaluation of Sympathectomy in Peripheral Vascular Disease, M. Debakey and A. Ochsner, 419
Delayed Suture in the Management of Wounds, K. F. Lowry and G. M. Curtis, 1130
Differential Diagnosis of Jaundice in Surgical Practice, J. F. Weir, 315
Difficult Genital Fistula: Temporary Decensus Uteri for Relief of Tension, G. A. Williams, 422
Division of Popliteal Vein in the Treatment of So-Called Varicose Ulceration, G. Bauer, 1227
Duodenal Fistula—Problems in Management, H. L. Albright and F. C. Leonard, 1035
Early Diagnosis of Gastric Cancer, Davis State, et al, 925
Effect of Analgesics and Antispasmodics on Common Duct Pressures, A. R. Currer and J. W. Gale, 1134
Effects of Hemoconcentration on the Ulcer Diathesis, I. D. Baronofsky, et al, 521
Efficacy of the Safety of the Intramuscular Administration of Bacitracin in Various Types of Surgical and Certain Medical Infections, F. L. Melency, et al, 322
Endometriosis: A Clinical and Pathological Study of 219 Cases, D. A. DeSanto and J. F. McBirnie, 316
Esophageal Arteries. An Anatomical Study of 150 Specimens, La V. L. Swigart, et al, 620
Estudo Anatomico de Particularidades Normais E Pastologicas de Superficie Interna da Veia Iliaca Comum Esquerda: Adesoes, S. E. Valvulas, L. J. A. de Dio, 920
Evaluation of Oxygen Therapy, P. B. Price, et al, 48
Evaluation of the Radical Hysterectomy in the Treatment of Carcinoma of the Cervix, J. F. Donnelly and J. B. Caldwell, 320
Experimental Ascites, F. W. McKee, et al, 48
Extension of Primary Neoplasms of Bone to Bone Marrow, J. E. Upshaw, et al, 323
Fate of Foreskin, D. Gairdner, 421
Fibrocystic Disease of the Pancreas, Wm. B. Ayers, et al, 524
Fracture of Ribs—A Logical Treatment, F. P. Coleman and L. Coleman, 520
Ganglioneuroma of the Nodose Ganglion of the Vagus, R. C. Clay, 1033

Gas Cysts of the Intestines (Cystic Pneumatosis), S. O. Friedlander and S. S. Teitelbaum, 924
Gastric and Duodenal Ulcers and Their Complications, H. Finsterer, 423
Giant Cell Tumor of the Thyroid Gland, D. Feriozi, 317
Giant Fibro-Adenoma of the Breast—"Cystosarcoma Pyyllodes," J. R. McDonald and S. W. Harrington, 525
Grave Spinal Cord Paralyses Caused by Spinal Anesthesia, Foster Kennedy, 1221
Humphrey Davy's Contribution to Anesthesia, F. F. Cartwright, 1224
Hyperfunctioning Tumors of Adrenal Cortex, W. Walters and R. G. Sprague, 316
Hypertrophy of Pyloric Muscle in Adult. Experiences with Conservative and Radical Surgical Treatment, J. C. McCann and M. A. Dean, 928
Incision for Exposure of the Gallbladder, J. S. Carman, 717
Intrathoracic Pheochromocytoma with Hypertension, H. C. Maier, 327
Intraspinal Segment Alcohol Block for Relief of Intractable Pain, F. P. Ansbro, 623
Ligation of the Vena Cava and Ovarian Vessels, C. G. Collins, et al, 422
Malignant Blood Vessel Tumors, Wm. D. McCarthy and G. T. Pack, 1222
Management of the Injured Kidney, H. W. McKay, 318
Management of Peripheral Nerve Injuries, R. J. Murphy, 1033
Marjolin's Ulcer, D. M. Glover and C. L. Keihn, 50
Massive Pulmonary Collapse Following Anesthesia with Curare, R. Foregger, et al, 419
Mutiple Superficial Epitheliomatosis with Special Reference to Treatment with Podophyllin, L. M. Smith and H. D. Garrett, 1036
Neurogenic Disease of the Bladder: The Surgical Management of its Complications, J. H. Semans, 420
New Concept of the Cause of Hirschsprung's Disease or Congenital Megalocolon with a New Method of Treatment by Surgery, A. H. Bill, Jr., 923
Newer Concepts in Surgery of the Pancreas, C. G. Child III, 522
Newer Methods for Selection of Patients for Lumbar Sympathectomy, Travis Winson, 1132
New Operative Procedure for Laryngofissure, E. N. Broyles, 318
Nongonorrheal Vulvovaginitis Due to Gram-Negative Intracellular Diplococci, J. D. Weaver, 1226
Operative Repair of Sliding Inguinal Hernia, G. K. Smith, 1223
Osteoid Osteoma: Etiology and Pathogenesis. Report of 12 New Cases, B. Pines, et al, 718
Pancreatic Cysts Simulating Carcinoma of the Head of the Pancreas, 616
Pathogenesis of Hyperthyroidism, P. Heinbecker, 45
Pathology of Certain Inflammatory Lesions and Neoplasms of the Small Bowel, Wm. J. Harris, Jr., 616
Peripheral Arterial Embolism, Wm. DeW. Andrus, 725
pHisodern with Hexachlorophene (G-11). Its Integrity as a Surgical Scrub, R. C. Bowers, 323
Place of Gastrectomy in the Treatment of Peptic Ulcer, R. M. Penick, Jr., 317
Plasmacytoma of the Thyroid Gland, F. E. Barton and D. A. Farmer, 1037
Pomeroy Method of Sterilization, C. B. Lull and R. M. Mitchell, 927
Postoperative Nitrogen Loss, S. C. Werner, et al, 50
Postoperative Pancreatitis, D. Metheney and V. O. Lundmark, 522
Postoperative Salt Retention and its Relation to Increased Adrenal Cortical Function, H. T. Johnson, et al, 1225
Prevention of Some Postgastrectomy Difficulties by New Gastrectomy Technic, M. E. Steinberg, 1224
Progressive Ulceration of the Abdominal Wall—Amoebiasis Cutis, O. B. Hunter, 1029
Prophylasis of Intravascular Clotting by the Use of Alpha Tocopherol and Calcium, John H. Kay, et al, 1135
Psychology of the Surgical Patient, A. Kennedy, 621
Rectosigmoid Anastomosis by Invagination in Chronic Inflammatory Conditions, Wm. H. Prioleau, 720
Refractory Alkalosis and the Potassium Ion in Surgical Patients, R. M. Nelson, 618
Repair of Single Cleft Lip by the Hagedorn Le Mesurier Technique, C. L. Straith, et al, 725
Results After Removal of Intervertebral Discs, R. T. Odell, et al, 1135
Role of X-Ray Therapy in Carcinoma of the Breast, H. W. Stone and Halvoe Vermund, 1031
Segmental Resection of the Esophagus in Infants. Champ Lyons, et al, 1029
Selective Management of Megacolon in Infants and Children, C. M. Lee, Jr., et al, 1132
Simple Method of Determining Blood Loss, T. Harrison and P. W. Harrison, 425
Solitary Cecal Diverticula, H. V. A. Heikel, 1136
Solitary Gallstone, R. S. Mechling and J. R. Watson, 1222

Splanchnic Nerve Section for Pancreatic Pain, G. de Takas, et al, 425
Streptococcal Enzymatic Debridement, Wm. S. Tillett, et al, 320
Studies of the Effects of Concomitant Venous Ligation in Acute Arterial Occlusion, M. L. Cullen, et al, 327
Subacute Thyroiditis, G. Crile, Jr., and E. W. Rumsey, 520
Surgical Management of Omphalocele, C. H. Maguire, 318
Surgery of the Sympathetic Nervous System, C. S. MacCarty, 325
Testicular Tumors: Late Results of Radical Surgery, A. W. Adams, 421
Thyroiditis, W. H. Kisner, et al, 420
Tobacco Smoking as a Possible Etiologic Factor in Bronchiogenic Carcinoma, E. L. Wynder and E. A. Graham
Total Gyctectomy—A Consideration of the Technic, T. Millin and F. Masina, 317
Transgastric Panscreatocystogastrostomy, R. E. Schovel and V. H. Halliger, 717
Treatment of Achalasia: Transthoracic Approach, E. S. A. King and Wm. L. Malley, 929
Treatment of Painful Amputation Stumps, W. R. Russell and J. M. K. Spalding, 1032
Treatment of Traumatic Hernia of the Diaphragm, C. R. Lam, 723
Tumors of the Bladder, W. C. Stirling and J. E. Ash, 322
Undescended Testes, W. H. Snyder, Jr., et al, 719
Use of Free Peritoneal Grafts in Intestinal Anastomoses, S. T. Chester, et al, 47
Acquired Megacolon, Report of a Case in a Seventy-four Year Old Male, J. C. Drye, 196
Acute Suppurative Mesenteric Lymphadenitis with Peritonitis—Report of a Case, J. C. Read, 855
Adenocarcinoma, mucinous, of the urinary bladder: See Armstrong
Adenomas, papillary of the colon: See Coleman
Adhesions, postoperative: See Peple, Jr.
Advances in the Treatment of Peripheral Vascular Diseases, G. T. Howard, Jr., 1016
Anderson, Robert L.: Mediastinal Tumors, 1093
Andrews, G. A.: See Bruner
Anehthesia, spinal: See Phillips
Anesthetic, complications of: See Bergner
Aneurysms, arterial: See McSwain
Anorectal Surgery—Pre and Postoperative Care, I. E. Harris, Jr., 837
Aortography, abdominal: See Ortner
Appendicitis in the Louisville General Hospital, J. C. Drye, 107
Armstrong, Charlton P.: Mucinous Adenocarcinoma of the Urinary Bladder, 297
Arterial Aneurysms, Barton, McSwain, 501
Arterial, spasm results: See Kirtley, Jr.
Asman, H. B.: Proctologic Examination and Diagnosis, 97
Aureomycin, treatment for peritonitis: See Yeager

B

Bacon, Harry E.: Surgical Management of Rectal Procidentia, 1115
Barnes, Thomas G.: See Yeager
Bartlett, Wayne C.: Polypoid Lesions of the Colon, 635
Beasley, B. T.: The Southern Surgeon, Editorial, 40
Beasley, B. T.: The Significance of Nipple Discharge, 23
Benign Lesions of the Breast, H. E. Snyder, 555
Berg, Harold F.: See Drye
Bergner, R. P.: Pathologic Pictures of Anesthetic Complications, 206
Biliary Tract, diseases associated with cholelithiasis: See Wallace
Bishop, Everett L.: The Diagnosis of Cancer by Smear Technic, 403
Blackford, L. Minor: Walter Goodloe Stuck, Editorial, 515
Bladder, urinary, comparative study of the effects of para-sympathetic-mimetic drugs: See Dodson
Bladder, urinary, mucinous adonecarcinoma of: See Armstrong
Blakemore, A. H.: The Portacaval Shunt in the Treatment of Portal Hypertension, 386
Blebs, pulmonary: See Welchons
Bleeding, uterine: See Douglas
Bone, autogenous refrigerated for spinal fusion: See Breck
Bone Bank Bone in Bone Surgery, C. R. Rountree, 966
Bone Diseases with Osteoporotic or Malacic Changes, M. M. Copeland, 677
Book Reviews:
Abnormal Phenumoncephalogram, L. M. Davidoff and B. S. Epstein, 714
Acute Injuries of the Head, Their Diagnosis, Treatment, Complications and Sequels, G. F. Rowbotham, 715
Atlas of Human Anatomy, B. J. Anson, 1220
Bone and Joint Diseases, J. V. Luck, 1219
Branchiogenic Anomalies, F. E. Bard, et al, 716
Breasts—Structure, Function, Disease, F. D. Sanermbch, 1027
Cancer of the Colon, and Rectum, F. W. Rankin and A. S. Graham, 1129
Chondrosis in Arteriosclerosis of the Lower Extremities, E. A. Edwards, 612
Clinical Uses of Intravenous Procaine, D. J. Grubard and M. C. Peterson, 917
Congenital Anomalies of the Heart and Great Vessels, T. L. Dry, et al, 313

Cranioplasty, D. L. Reeves, 1027
Current Therapy 1950, H. F. Kahn, 518
Cytologic Diagnosis of Cancer, by the Staff of the Vincent Memorial Hospital, 614
Diagnosis and Treatment of Tumors of the Head and Neck, G. E. Ward and J. W. Hendricks, 1026
First Anesthetic. The Story of Crawford W. Long, Frank K. Boland, 916
Handbook of Surgical Urology for Internes, Hospital Corpsmen, and Nurses, N. F. Ockerblad, 43
Illustrations of Surgical Treatment—Instruments and Appliances, E. L. Farquharson, 42
Intestinal Intubation, M. O. Canton, 314
Lord Lister—His Life and Doctrine, Douglas Guthrie, 417
Merck Manual of Diagnosis and Therapy, 715
Operative Obstetrics, Reguia Chair and J. C. Moir, 1128
Operative Surgery, A. Miles and Sir James Learmonth, 611
Orthopaedic Surgery, T. P. McMurray, 313
Personality and Peptic Ulcer, A. J. Sullivan and T. E. McKell, 1028
Practical Neurological Diagnosis, R. G. Spurling, 416
Principles and Practice of Plastic Surgery, A. J. Barsky, 416
Pye's Surgical Handicraft, Hamilton Bailey, 1128
Resuscitation and Anesthesia for Wounded Men, H. K. Beecher, 611
Short Practice of Surgery, H. Bailey and R. J. McNeill, 43
Surgery for Nurses, James Moroney, 714
Surgical Treatment for Abnormalities of the Heart and Great Vessels, R. E. Gross, 614
Surgical Treatment of Facial Injuries, V. H. Kazanjian and J. H. Converse, 42
Techniques in British Surgery, Rodney Meingot, 1026
Varicose Veins, R. R. Foote, 714
Water and Salt Deletion, H. L. Marriotte, 615
Woman's Surgeon, Life Story of J. Marion Sims, Seale Harris, 916
Botryomycosis and Actinomycosis of the Intestine Appearing as Foreign Body Granuloma, Paul Kimmelstiel, 270
Bowie, Clyde F.: Injuries of the Genito-Urinary Tract, 548
Bradshaw, H. H.: See Postlethwait
Bradshaw, H. H.: See Williams
Breck, Louis W.: Spinal Fusion for Scoliosis Employing Refrigerated Autogenous Bone, 981
Brain, infections following penetrating wounds: See Neill
Brantigan, O. C.: Extrapleural Methyl Methacrylate Plombage in the Treatment of Apical Pulmonary Tuberculosis, 1149
Breast, benign lesions: See Snyder
Breast, self-examination of: See Stephenson
Bruner, H. D.: Cancer Research Program of Oak Ridge Institute of Nuclear Studies, 577
Bullae, pulmonary: See Welchons
Burkett, Wendell J.: See Bacon
Bursitis, shoulder and subacromial: See Fischer
Butt, Arthur J.: Ureteral Injury Complicating Fracture of the Bony Pelvis, 1139

C

Callaway, Enoch: Carcinoma of the Cervix, 1088
Cancer, diagnosis of by smear technic: See Bishop
Cancer Research Program of Oak Ridge Institute of Nuclear Studies, H. D. Bruner, 577
Carcinoids, of the ileum with papillary adenomas of the colon: See Coleman
Carcinoma of the Cervix, Enoch Callaway, 1088
Carcinoma of the Colon, Frank S. Johns, 17
Carcinoma, epidermoid of ureter: See Reaves
Carcinoma of Esophagus: A Report of Seventeen Cases, J. E. Hamilton, 118
Carcinoma of the Corpus Uteri, C. Panettiere, 594
Carcinoma of the pancreas: See Abell, Jr.
Carcinoma of the stomach: See Schafer
Carotid Body Tumors—Case Report and Discussion, B. P. Rentz, 860
Carotid Body Tumors: See McNealy
Carter, E. Kent, Ewing's Tumor of the Vertebrae, 796
Cauda equina, tumors: See Furlow
Cecum, duplication of: See Kunath
Cervical disc, intervertebral: See Haynes
Cervical spine, degenerative changes of: See Overton
Cervix, carcinoma of: See Callaway
Cervix Uteri, granuloma inguinale of: See Hoge
Changes in Extracellular Fluid and Cardiac Output in Hemorrhagic Shock, C. Handley, 673
Cholelithiasis—A Surgical Disease, J. Duffy Hancock, 227
Cholelithiasis, diseases of the biliary tract associated with: See Wallace
Chronic Benign Suppurative Disease of the Lungs, Wm. B. Condon, 230
Clagus, C. E.: See Garner
Claud, Harry Lee: Two Types of Plastic Operations of Particular Interest to the General Surgeon, 1200
Clifford, Wm. J.: Postoperative Parotiditis, 584
Clifford, Wm. J.: Prolapsed Gastric Mucosa, 627

Clinical Evaluation of Vagotomy in the Treatment of Peptic Ulcer, M. Nordland, 2
Coleman, Custis L.: Multiple Metastasizing Carcinoids of the Ileum with Simultaneous Papillary Adenomas of the Colon Complicated by Intussusception and Gangrene, 777
Colon, Adenomas of: See Markowitz
Colon, carcinoma of: See Johns
Colon, malignant lesions of: See Hunt
Colon, polypoid lesions of: See Bartlett
Colostomy Closure, Don C. Robertson, 285
Colvin, E. M.: See Wallace
Comparative Study of the Effects of Para-Sympathetic-Mimetic Drugs on the Urinary Bladder, A. I. Dodson, 812
Complications of Splenectomy, J. D. Martin, Jr., 1047
Compton, J. W.: See Carter
Condon, Wm. B.: Chronic Benign Suppurative Disease of the Lungs, 230
Congenital Right-Sided Diaphragmatic Hernia in Children, G. T. Howard, Jr., 842
Cooper, Manuel N.: See Martin, Jr.
Copeland, Murray M.: Bone Diseases with Osteoporotic or Malacic Changes, 677
Coverage Problem of the Injured Extremity, D. W. Robinson, 933
Cystadenoma of the Pancreas, T. M. Johnson, 878
Cyst, enteric: See Kunath

D

Daniel, Walter W.: Imperforate Hymen with Hematocolpos, 473
Dean, Gilbert O.: Some Surgical and Technical Aspects in the usage of Wire Sutures, 250
Deaths Following Vagotomy, R. W. Postlethwait, 437
Degenerative Changes in the Cervical Spine as a Common Cause of Shoulder and Arm Pain, L. M. Overton, 599
Dennis, E. W.: See Martin
DeQuervain's Stenosing Tendo-Vaginitis at the Radial Styloid Process, E. G. Edwards, 1081
Dermatologic lesions: See Straith
Diagnosis of Cancer by Smear Technic, E. L. Bishop, 403
Diagnosis of Obstructive Jaundice, G. Y. Graves, 240
Diagnosis, proctologic examination of: See Asman
Diagnosis, sigmoidovesical fistula: See White
Diseases of the Biliary Tract Associated with Cholelithiasis, F. T. Wallace, 655
Dislocation, simultaneous of both shoulders: See Rapp
Diveley, Walter: See McSwain
Dodson, Austin I.: A Comparative Study of the Effects of Para-Sympathetico-Mimetic Drugs on the Urinary Bladder, 812
Dodson, Austin I., Jr.: See Harris
Dodson, Austin I.: Surgical Management of Ureteropelvic Obstruction, 816
Douglas, Gilbert F.: Uterine Bleeding: The Gynecologist's Bete Noire, 1072
Drye, James C.: Acquired Megacolon: Report of a Case in a Seventy-four Year Old Male, 196
Drye, James C.: Appendicitis in the Louisville General Hospital, 107
Duct disease, and gallbladder, some phases of: See Sanders
Duncan, Ellis: See Hamilton
Dunlap, E. B., Jr.: See Rieth
Duplication of the Cecum (Enteric Cyst), C. A. Kunath, 662

E

Editorials:
Hazards and Mishaps in the Practice of Urology, C. A. Fort, 306
Medical Profession and the Hospitals. Are Their Problems Resolvable? Elmer Hess, 907
Operative Risk in the Elderly Patient, J. D. Martin, Jr., 1125
Receptive and Analytic Mind: An Essential to Surgical Progress, C. W. Mayo, 1219
Self-Examination of the Breasts, R. H. Stephenson, 1024
Southern Surgeon, 1950, B. T. Beasley, 40
Stuck, Walter Goodloe, Minor L. Blackford, 515
Surgical Treatment of Portal Hypertension, H. B. Hay, 712
University of Louisville, J. M. Kinsman, 223
Urologic Aspects of Excision of the Rectum, Charles Rieser, 609
Virginia Medical College Number, H. B. Haag, 835
Washington Meeting, R. L. Sanders, 412
Edwards, Ernest G.: DeQuervain's Stenosing Tendo-Vaginitis at the Radial Styloid Process, 1081
Effect of Medical Education Upon Our Economic Future, R. J. Wilkinson, 329
Electrolyte Considerations in the Field of Surgery, R. A. Neubauer, 754
Embolism, pulmonary by amniotic fluid: See Hoback
Epidermoid Carcinoma of Ureter, J. U. Reaves, 509
Esophagus, carcinoma of: See Hamilton
Esophagus, transthoracic resection of: See Schafer
Ewell, George H.: Vesical Dysfunction Following Abdomino-Perineal Rectosigmoidectomy, 464
Ewing's Tumor of the Vertebrae, E. K. Carter, 796
Extrapleural Methyl Methacrylate Plombage in the Treatment of Apical Pulmonary Tuberculosis, O. C. Brantigan, 1149

Extremity, injured, coverage problem: See Robinson

F

Face wounds, contusion, laceration of: See Pastore
Ferguson, James H.: Induction of Labor by a Dilute Pitocin Infusion, 1106
Fibroid, uterine: See LeDoux
Fischer, Harry W.: Surgical Treatment of Portal Hypertension, 996
Fischer, K. Armand: The Nature of and Treatment of Tendinitis of the Musculotendinous Cuff of the Shoulder and Subacromial Bursitis, 132
Fistula, sigmoidovesical, diagnosis and recent advance in surgical treatment of: See White
Fitch, Willard M.: See Legg
Forsee, Colonel James H.: See Salyer
Fort, Chester A.: Hazards and Mishaps in the Practice of Urology, Editorial, 306
Fracture, bony pelvis: See Butt
Fractures, multiple, in the same patient: See Stuck
Fractures, supracondylar: See Wright
Frelick, Robert W.: See Neubauer
Frech, H. C.: Multiple Primary Malignant Tumors, 13
Frontal Lobotomy for the Relief of Intractable Pain, E. G. Grantham, 181
Fuler, J. Luther: See Henderson
Furlow, Leonard T.: Lumbar Lordosis as a Sign of Cauda Equina Tumor in Children, 1065

G

Gallbladder, and duct disease, some phases of: See Sanders
Gangrene of ileum and colon: See Coleman
Gangrene of colon: See Markowitz
Garner, Byron O.: Surgical Treatment of Peptic Ulcer Comparing Vagotomy and Gastric Resection, 150
Gastric, prolapse of mucosa: See Clifford
Gastric Resection, in peptic ulcer: See Garner
Gastrointestinal tract, in infants, obstruction of: See Maguire
Gay, Ellery C.: Traumatic Avulsion of the Skin of the Shaft of the Penis and Scrotum, 870
Gibson, David M.: See Johnson
Gilbert, Donald R.: See Dodson
Gottschalk, R. B.: Multiple Primary Malignant Tumors, 13
Gottschalk, R. B.: See Frech
Grantham, Everett G.: Frontal Lobotomy for the Relief of Intractable Pain, 181
Granuloma, foreign body appearing as: See Kimmelstiel
Granuloma inguinale, streptomycin in the treatment of: See Hoge
Graves, G. Y.: The Diagnosis of Obstructive Jaundice, 240
Griffin, David W.: See Garner
Griswod, R. Arnold: See Schuster III
Grosjean, Wendell A.: See Snyder, H. E.
Gynecologist's Bete Noire: See Douglas

H

Haag, H. B.: Medical College of Virginia, 836
Hamilton, J. E.: Carcinoma of Esophagus: A Report of Seventeen Cases, 118
Hamilton, J. E.: See Garner
Hancock, J. Duffy: Cholelithiasis—A Surgical Disease, 227
Hancock, J. Duffy: Ligation of the Larger Venous Channels, 704
Handley, C.: Changes in Extracellular Fluid and Cardiac Output in Hemorrhagic Shock, 673
Harlin, Harrison C.: Mucinous Adenocarcinoma of the Urinary Bladder, 297
Harlin, Harrison C.: See Armstrong
Harper, Fred R.: See Condon
Harris, Isaac E., Jr.: Anorectal Surgery—Pre and Postoperative Care, 837
Harter, John S.: Treatment of Lung Abscess, 191
Hay, Elliott B.: See Handley
Hay, Elliott B.: Surgical Treatment of Portal Hypertension, Editorial, 712
Hemangioendothelioma: Review of the Literature, Q. J. Legg, 803
Hematocolpos, imperforate hymens: See Daniel
Henderson, Andrew D.: See Reaves
Henderson, E. L.: Total Versus Subtotal Hysterectomy, 456
Hernia, diaphragmatic, in children, congenital: See Howard, Jr.
Hernias, inguinal: See Koontz
Hernias, ventral: See Koontz
Hersberger, L. R.: Duplication of the Cecum (Enteric Cyst), 662
Hershberger, L. R.: See Kunath
Hess, Elmer: The Medical Profession and the Hospitals. Are Their Problems Resolvable? Editorial, 907
Hoback, Wm. W.: Pulmonary Embolism by Amniotic Fluid. Review of Literature, 281
Hoge, Randolph H.: Streptomycin in the Treatment of Granuloma Inguinale of the Cervix Uteri and Vulva, 746
Hoover, M. J.: Treatment of the Tuberculous Psoas Abscess, 729
Hopkins, Wm. A.: See Rieth
Howard, G. T., Jr.: Congenital Right-Sided Diaphragmatic Hernia in Children, 842
Huggins, H.: See Handley
Humerus, fractures of: See Wright
Hunt, Claude J.: Some Technical Problems Associated with Complicated Malignant Lesions of the Colon, 986
Hutaff, Lucile W.: See Williams

Hymen, imperforate with hematocolpos: See Daniel
Hypertension, portacaval shunt in surgical treatment of: See Blakemore
Hypertension, portal surgical treatment of: See Fischer
Hypertension, surgical treatment of: See Jelsma
Hypertension, sympathectomy for: See Schuster III
Hysterectomy, total versus subtotal: See Henderson

I

Ileum, multiple metastasizing carcinoids of: See Coleman
Imperforate Hymen with Hematocolpos, W. W. Daniel, 473
Incidence of Peptic Ulcer Following Sympathectomy for Hypertension, G. Schuster III, 172
Induction of Labor by a Dilute Pitocin Infusion, J. H. Ferguson, 1106
Infections of the Brain Following Penetrating Wounds, C. L. Neill, 341
Infusion, pitocin dilute: See Ferguson
Injuries of the Genito-Urinary Tract, C. F. Bowie, 548
Intussusception—A Comparison of the Infant and Adult Types, J. D. Martin, Jr., 527
Intussusception, of colon: See Markowitz
Intussusception, with carcinoids of the ileum: See Coleman
Invasive Fibrous Tumors of the Abdominal Wall, R. M. Moore, 1177

J

Jaundice, obstructive, diagnosis of: See Graves
Jelsma, Franklin: Surgical Treatment of Hypertension, 476
Johns, Frank S.: Carcinoma of the Colon, 17
Johnson, Thomas M.: Cystadenoma of the Pancreas, 878

K

Keschner, Harold W.: See Clifford
Kimmelstiel, Paul: Botryomycosis and Actinomycosis of the Intestine Appearing as Foreign Body Granuloma, 270
King, W. B., Jr.: See Moore
Kinsman, J. Murray: The University of Louisville, Editorial, 223
Kirtley, James A., Jr.: Some Results of Arterial Spasm, 645
Koontz, Amos R.: Tantalum Mesh in the Repair of Ventral and Inguinal Hernias, 1143
Kunath, Carl A.: Duplication of the Cecum (Enteric Cyst), 662

L

Labor, induction of: See Ferguson
Late Symptoms of Carcinoma of the Pancreas, Irvin Abell, Jr., 168
Leatherman, Kenton D.: See Fischer
LeDoux, Lucien A.: C. Jeff Miller Lectureship, 1041
Legg, Quentin J.: Endothelioma: Review of the Literature, 803
Lewis, John R.: See Straith
Lich, Robert, Jr.: Surgical Relief of Vesical Neck Obstruction in Children, 127
Ligation of the Larger Venous Channels, J. Duffy Hancock, 704
Lobotomy, frontal, for the relief of intractable pain: See Grantham
Lobectomy in the Treatment of Pulmonary Tuberculosis: A Preliminary Report, Lt. Col. John M. Salyer, 262
Lordosis, lumbar, in children: See Furlow
Lumbar Lordosis as a Sign of Cauda Equina Tumor in Children, L. T. Furlow, 1065
Lung, abscess, treatment of: See Harter
Lungs, chronic, benign suppurative disease of: See Condon
Lymphadentitis, acute suppurative mesenteric, with peritonitis: See Read
Lynn, Wm. D.: See Yeager

M

McCallen, Albert M.: See Clifford
McNealy, Raymond W.: Surgical Management of Carotid Body Tumors, 1059
McSwain, Barton: Arterial Aneurysms, 501
Maguire, C. H.: Obstruction of the Gastrointestinal Tract in Infants, 144
Markowitz, Martin: See Coleman
Marshall, Clark: See Nordland, M.
Martin, J. D., Jr.: Complications of Splenectomy, 1047
Martin, J. D., Jr.: Intussusception—A Comparison of the Infant and Adult Types, 527
Martin, J. D., Jr.: The Operative Risk in the Elderly Patient, Editorial, 1125
Massie, J. R., Jr.: See Welcons
Maurer, Joseph E.: See Lich
Mayo, Charles W.: A Receptive and Analytic Mind: An Essential to Surgical Progress, Editorial, 1217
Mediastinal Tumors, Robert L. Anderson, 1093
Medical education, the effect upon our economic future: See Wilkinson
Megacolon, acquired: See Drye
Meredith, J. M.: Osteoma of the Cranial Vault and Base, 785
Methyl Methacrylate, extrapleural plombage: See Brantigan
Miller, C. Jeff Lectureship—His Teachings in the Management of Uterine Fibroids, L. A. LeDoux, 1041

Millington, George H.: See Breck
Moore, Robert M.: Invasive Fibrous Tumors of the Abdominal Wall, 1177
Mucinous Adenocarcinoma of the Urinary Bladder, C. P. Armstrong, 297
Mucosa, prolapsed: See Clifford
Multiple Fractures in the Same Patient, W. G. Stuck, 898
Multiple Metastisizing Carcinoids of the Ileum with Simultaneous Papillary Adenomas of the Colon Complicated by Intussusception and Gangrene, C. L. Coleman, 777
Multiple Primary Malignant Tumors, H. C. Fesch, 13

N

Nature of and Treatment of Tendency of the Musculotendinous Cuff of the Shoulder and Subacromial Bursitis, K. A. Fisher, 132
Negro, aged, surgical problems in: See Parsons
Neill, Charles L.: Infections of the Brain Following Penetrating Wounds, 341
Neubauer, Richard A.: Some Electrolyte Considerations in the Field of Surgery, 754
Neurosurgical Procedures for the Relief of Intractable Pain, C. E. Troland, 485
New Surgical Procedure in Scoliosis Therapy, P. L. Rieth, 368
Nipple, discharge, significance of: See Beasley
Nordland, Martin: A Clinical Evaluation of Vagotomy in the Treatment of Peptic Ulcer, 2
Nordland, Martin A.: See Nordland, M.
Nuclear, studies, Oak Ridge Institute: See Bruner

O

Oak Ridge Institute of nuclear studies, cancer research: See Bruner
Oates, G. P.: See Gay
Obstruction of the Gastrointestinal Tract in Infants, C. H. Maguire, 144
Obstruction, ureteropelvic, surgical management of: See Dodson
Obstruction, vesical neck in children, relief of: See Lich, Jr.
On to Washington, R. J. Wilkinson, 1
Operative Risk in the Elderly Patient, Editorial, J. D. Martin, Jr., 1125
Ortner, Alvin B.: Abdominal Aortography, 157
Osman, D. A.: See Rentz
Osteoma of the Cranial Vault and Base, J. M. Meredith, 785
Overton, Lewis M.: Degenerative Changes in the Cervical Spine as a Common Cause of Shoulder and Arm Pain, 599

P

Panettiere, Cayetano: Carcinoma of the Corpus Uteri, 594
Pain, intractable, neurosurgical procedures of: See Troland
Pancreas, cystadenoma of: See Johnhon
Pancreas, carcinoma of: See Abel, Jr.
Parotiditis, postoperative: See Clifford
Parsons, Willard H.: Surgical Problems in the Aged Negro
Pastore, Peter N.: A Satisfactory Method for Dressing Severe Contusion Lacerated Abrasion Wounds of the Face, 744
Pathologic Pictures of Anesthetic Complications, R. P. Bergner, 206
Pelvis: See Perry
Pelvis, bony: See Butt
Penis, traumatic avulsion of the skin: See Gay
Peple, W. L., Jr.: Postoperative Adhesions, 737
Peritonitis: See Lynn
Peritonitis: See Read
Peritonitis, treatment of: See Yeager
Perry, Joseph Q.: See Butt
Phillips, Hayward S.: Spinal Anesthesia and Some of its Modern Aspects, 668
Pirkery, Everett L.: See Drye
Pitocin, infusion: See Ferguson
Phases of Gallbladder and Duct Disease, R. L. Sanders, 429
Plastic operations: See Claud
Plastic Surgery in Dermatologic Lesions, C. L. Straith, 373
Plombage, in treatment of tuberculosis: See Brantigan
Polypoid Lesions of the Colon, Wayne C. Bartlett, 635
Portacaval Shunt in the Surgical Treatment of Portal Hypertension, A. H. Blakemore 386
Porter, Reno R.: See Neubauer
Postlethwait, R. W.: Deaths Following Vagotomy, 437
Postlethwait, R. W.: See Williams
Postoperative Adhesions—A Case Report, W. L. Peple, Jr., 737
Postoperative Parotiditis, Wm. J. Clifford, 584
Procidentia, rectal, management of: See Bacon
Proctologic Examination and Diagnosis, H. B. Asman, 97
Progress, surgical: See Mayo
Prolapsed Gastric Mucosa, Wm. J. Clifford, 627
Pulmonary Blebs and Bullae, G. A. Welchons, 768
Pulmonary Embolism by Amniotic Fluid: Review of the Literature, Wm. H. Hoback, 281
Pulskamp, M. H.: Tumors of the Rectum, 204

R

Rapp, I. H.: Simultaneous Dislocation of Both Shoulders, 852
Read, J. C.: Acute Suppurative Mesenteric Lymphadentitis with Peritonitis, 855
Reaves, J. Ullman: Epidermoid Carcinoma of Ureter, 509
Receptive and Analytic Mind: An Essential to Surgical Progress, C. W. Mayo, Editorial, 1217
Rectal, procidentia: See Bacon
Rectosigmoidectomy, abdomino-perineal: See Ewell
Rectum, excision of: See Rieser
Rectum, tumors of: See Pulskamp
Rentz, B. P.: Carotid Body Tumors, Case Report and Discussion, 860
Results of Arterial Spasm, J. A. Kirtley, Jr., 645
Rieser, Charles: Urologic Aspects of Excision of the Rectum, 609
Rieth, Paul L.: A New Surgical Procedure in Scoliosis Therapy, 368
Robertson, Don C.: Colostomy Closure, 285
Robinson, David W.: The Coverage Problem of the Injured Extremity, 933
Rountree, Charles R.: Use of Bone Bank Bone in Bone Surgery, 966
Rowe, Ed. B.: See Moore

S

Salyer, Lt. Col. John M.: Lobectomy in the Treatment of Pulmonary Tuberculosis, 262
Salzberg, Arnold M.: See Hoge
Sanders, R. L.: Some Phases of Gallbladder and Duct Disease, 429
Sanders, R. L.: The Washington Meeting, Editorial, 413
Satisfactory Method for Dressing Severe Contusion Lacerated Abrasion Wounds of the Face, Peter N. Pastore, 744
Sauer, Illydio: See Bacon
Schafer, Paul W.: Transthoracic Resection of the Esophagus and Stomach for Carcinoma, 537
Schoen, A. M.: See Schuster III
Schuster, George, III: The Incidence of Peptic Ulcer Following Sympathectomy for Hypertension, 172
Scoliosis, spinal fusion for: See Breck
Scoliosis, surgical procedures in: See Hopkins
Scoliosis, therapy: See Rieth
Scrotum, traumatic avulsion of the skin of: See Gay
Segerberg, Ludwig H.: See Neill
Shock, hemorrhagic changes in extracellular fluid and cardiac output: See Handley
Shoulders, dislocation of: See Rapp
Shoulder and arm pain: See Overton
Sigmoidovesical Fistula, Diagnosis and Recent Advance in Surgical Treatment, C. S. White, 954
Significance of Nipple Discharge, B. T. Beasley, 23
Simultaneous Dislocation of Both Shoulders, I. H. Rapp, 852
Slate, Thomas A.: See Ferguson
Smear technic, diagnosis of cancer: See Bishop
Snyder, Cecil D.: See Snyder, H. E.
Snyder, H. E.: Benign Lesions of the Breast, 555
Spasm, arterial results of: See Kirtley, Jr.
Spencer, Francis M.: See Kunath
Spinal Anesthesia and Some of its Modern Aspects, H. S. Phillips, 668
Spinal Fusion for Scoliosis Employing Refrigerated Autogenous Bone, L. W. Breck, 981
Spine, cervical, degenerative changes: See Overton
Splenectomy, complications of: See Martin, Jr.
Splenectomy, Indications and Results, R. W. Williams, 885
Stephenson, R. H.: Self-Examination of the Breast, Editorial, 1024
Stomach, carcinoma of: See Schafer
Straith, Claire L.: Plastic Surgery in Dermatologic Lesions, 373
Streptomycin in the Treatment of Granuloma Inguinale of the Cervix Uteri and Vulva, R. H. Hoge, 746
Stuck, Walter Goodloe, L. Minor Blackford, Editorial, 515
Stuck, Walter Goodloe: Multiple Fractures in the Same Patient, 898
Styloid Process, radial: See Edwards
Supracondylar Fractures of the Humerus, Peter B. Wright, 569
Surgery, anorectal: See Harris, Jr.
Surgery, electrolyte considerations in the field of: See Neubauer
Surgery, plastic in dermatologic lesions: See Straith
Surgical and Technical Aspects in the Usage of Wire Sutures, G. O. Dean, 250
Surgical Management of Carotid Body Tumors, R. W. McNealy, 1059
Surgical Management of Rectal Procidentia, H. E. Bacon, 1115
Surgical Management of Ureteropelvic Obstruction, A. I. Dodson, 816
Surgical Problems in the Aged Negro, W. H. Parson, 1163
Surgical Relief of Vesical Neck Obstruction in Children, R. Lich, Jr., 127
Surgical Treatment of Peptic Ulcer Comparing Vagotomy and Gastric Resection, B. O. Garner, 150
Surgical Treatment of Portal Hypertension, H. W. Fischer, 996
Surgical Treatment of Protruded Inter-Vertebral Cervical Disc, W. G. Haynes, 496
Sweitzer, Caesar, J.: See McNealy
Sympathectomy, in hypertension: See Schuster III

T

Tantalum Mesh in the Repair of Ventral and Inguinal Hernias, A. R. Koontz, 1143
Technical Problems Associated with Complicated Malignant Lesions of the Colon, Claude H. Hunt, 986
Tendo-vaginitis, stenosing: See Edwards
Thompson, Col. M. S.: See Stuck
Tillotson, Maj. J. K.: See Stuck
Total Versus Subtotal Hysterectomy, E. L. Henderson, 456
Transthoracic Resection of the Esophagus and Stomach for Carcinoma, P. W. Schafer, 537
Traumatic Avulsion of the Skin of the Shaft of the Penis and Scrotum, E. C. Gay, 870
Treatment of Lung Abscess, J. S. Harter, 191
Treatment of Peritonitis of Appendiceal Origin with Aureomycin, G. H. Yeager, 1192
Treatment of sigmoidovesical fistula: See White
Treatment of Tuberculous Psoas Abscess, M. J. Hoover, 729
Troland, Charles E.: Neurosurgical Procedures for the Relief of Intractable Pain, 485
Tuberculosis, apical: See Brantigan
Tuberculosis, pulmonary: See Brantigan
Tuberculosis, pulmonary, lobectomy in the treatment of: See Salyer
Tuberculous, psoas abscess, treatment of: See Hoover
Tumors, abdominal wall: See Moore
Tumor, Ewing's: See Carter
Tumors, carotid body: See McNealy
Tumors, carotid body: See Rentz
Tumors, cauda equina: See Furlow
Tumors, malignant, multiple primary: See Frech
Tumors, mediastinal: See Anderson
Tumors of the Rectum, M. H. Pulskamp, 204
Types of Plastic Operations of Particular Interest to the General Surgeon, Harry Lee Claud, 1200

U

Ulcer, peptic, incidence of following sympathectomy for hypertension: See Schuster III
Ulcer, peptic: See Nordland
Ulcer, peptic, surgical treatment of: See Garner
Ureter, epidermoid carcinoma of: See Reaves
Ureteral Injury Complicating Fractures of the Bony Pelvis, A. J. Butt, 1139
Ureteropelvic, surgical management of obstruction: See Dodson
Urinary tract, injuries of: See Bowie
Uteri Corpus, carcinoma of: See Panettiere
Uterine Bleeding: The Gynecologist's Bete Noire, G. F. Douglas, 1072
Uterine, fibroids of: See LeDoux

V

Vagotomy, death following: See Postlethwait
Vagotomy, in peptic ulcer: See Garner
Vagotomy, in peptic ulcer treatment: See Nordland
Vascular diseases, treatment of peripheral: See Howard, Jr.
Venous channels, ligation of: See Hancock
Vertebrae, Ewing's tumor of: See Carter
Vesical Dysfunction Following Abdomino-Perineal Rectosigmoidectomy, G. H. Ewell, 464
Vesical neck, obstruction in children: See Lich, Jr.
Vulva, Granuloma inguinale of: See Hoge

W

Wallace, Furman T.: Diseases of the Biliary Tract Associated with Cholelithiasis, 655
Washington, On to: See Wilkinson
Welchons, G. A.: Pulmonary Blebs and Bullae, 768
White, Charles Stanley: Sigmoidovesical Fistula, 954
White, C. S., Jr.: See White, C. S.
Wilkinson, R. J.: Effect of Medical Education Upon Our Economic Future, 329
Wilkinson, R. J.: On to Washington
Williams, Robert W.: Splenectomy: Indications and Results, 885
Williams, William T.: See Parsons
Wire sutures, surgical and technical aspects in the use of: See Dean
Wood, A. W., Jr.: See Rentz
Wounds, of brain: See Neill
Wright, Peter B.: Supracondylar Fracture of the Humerus, 569

Y

Yeager, George H.: Treatment of Peritonitis of Appendiceal Origin with Aureomycin, 1192

Z

Zarzecki, C. A.: See Rapp

New York University
Post-Graduate Medical School
(A Unit of the New York University-Bellevue Medical Center)

477 First Avenue, New York 16, N. Y.

DEPARTMENT OF SURGERY

ANATOMY AND PHYSIOLOGY OF THE AUTONOMIC NERVOUS SYSTEM AND ITS CLINICAL APPLICATION

March 5 through 10, 1951

A full-time, 48 hour course. Monday through Saturday noon, devoted to anatomy and physiology of the autonomic nervous system. Anatomical demonstrations and prosections are correlated with clinical conferences and lectures. Assigned library reading with a three-hour round table conference on the last day with all members of the faculty participating.

Given by the Department of Anatomy of the College of Medicine and the Department of Surgery of the Post-Graduate Medical School.

THE BASIC PROBLEMS IN CANCER THERAPY, FOR SURGEONS (FOR SPECIALISTS)

12 days—full-time. January 22 through February 3, 1951

An intensive course on the basic problems of cancer therapy.

REVIEW OF GENERAL SURGERY (FOR SPECIALISTS)

4 weeks—full-time. April 2 through 28, 1951

Provides advanced instruction in general surgery by means of demonstrations and lectures on the various operating procedures and a review of applied surgical anatomy on the cadaver.

For Application and Information About These and Other Courses, Address:
Office of the Dean Post-Graduate Medical School

NOTICE

The Annual Assembly of The Southeastern Surgical Congress will be held at the Hollywood Beach Hotel, Hollywood, Florida, April 11-14, 1951.

For hotel reservations, write to the manager of the hotel.

For other information, write to the secretary, Dr. B. T. Beasley, 701 Hurt Building, Atlanta, Ga.

NOTICE

The Southern Section of the United States Chapter of the International College of Surgeons will hold a meeting in Atlanta at the Biltmore Hotel January 11, 12, 13, 1951.

A well rounded program will be presented by some of the nation's outstanding surgeons.

The medical profession is invited.